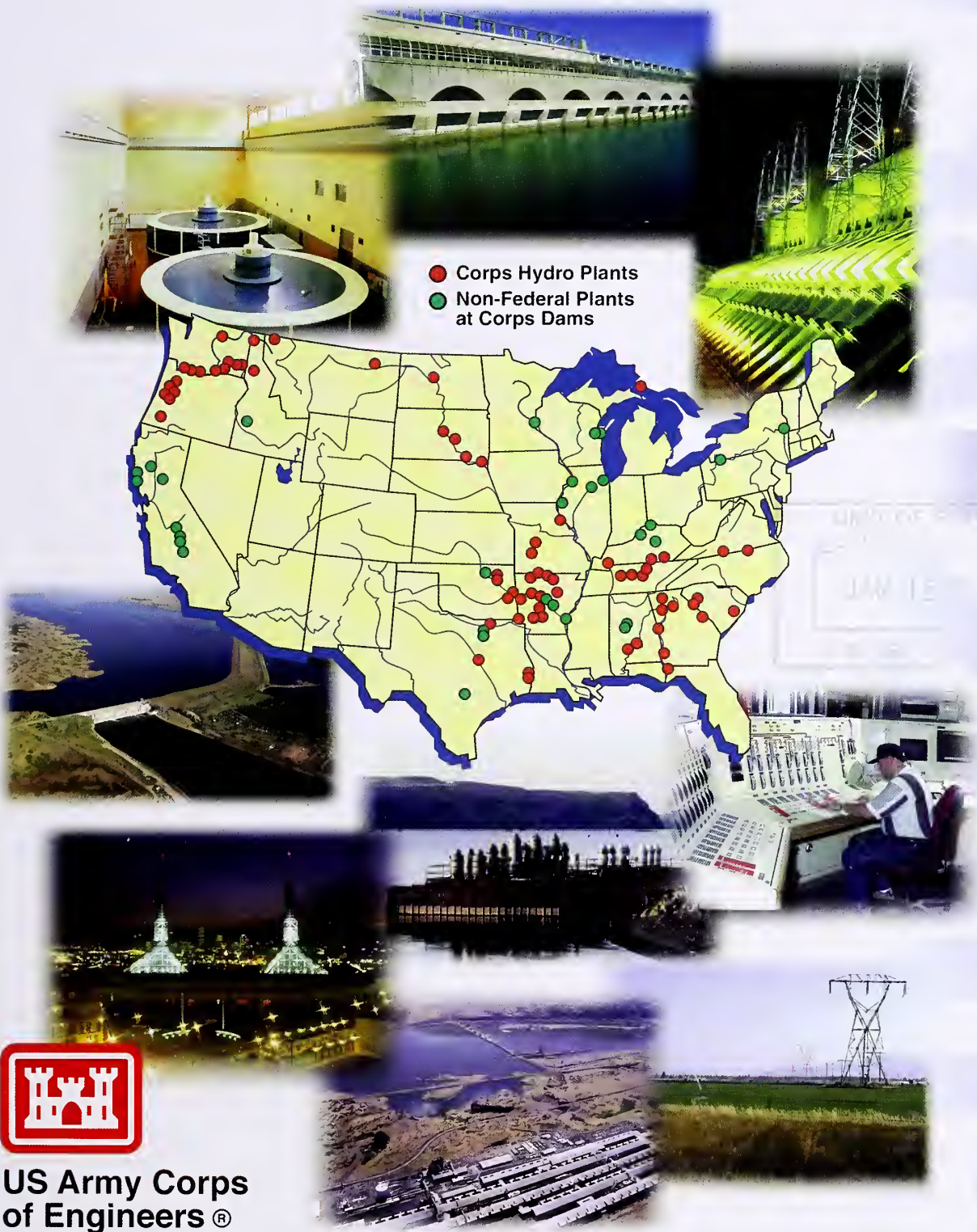
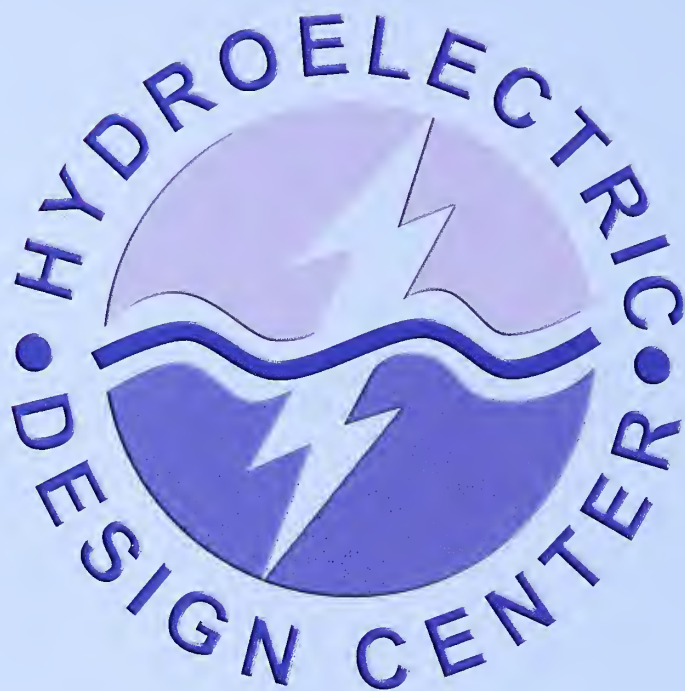


A HISTORY OF THE US ARMY CORPS OF ENGINEERS HYDROELECTRIC DESIGN CENTER



US Army Corps
of Engineers®

3847





A HISTORY OF THE
US ARMY CORPS OF ENGINEERS
**HYDROELECTRIC
DESIGN CENTER**
1938 - 2005

A collage of various hydroelectric projects, including dams, powerhouses, and reservoirs, serving as a background for the text.

**DEDICATED TO THE EMPLOYEES,
PAST AND PRESENT, OF THE
HYDROELECTRIC DESIGN CENTER**



**US Army Corps
of Engineers®**



FOREWORD

For nearly sixty years, the U.S. Army Corps of Engineers' Hydroelectric Design Center (HDC) has helped shape the development of the Nation's water resources. *The History of the Hydroelectric Design Center 1938-2005* documents HDC's proud contributions, from the initial development of some of the largest hydroelectric generation projects in the world to the repair, uprating, and modernization of those facilities. The employees of HDC have played a critical role in providing engineering services to the Nation's largest producer of hydropower. This history gives voice to their stories.

Since its beginning, the design center has been on the cutting edge of technological advances to meet the evolving needs of a growing Nation; from maximizing power generation and designing pump stations that are helping to restore the Everglades to improving juvenile salmon passage and increasing in-river dissolved oxygen levels.

As director, I am proud to present our rich and varied history. This is an organization focused on maintaining its technical expertise, achieving customer outcomes, and delivering quality products -- an organization dedicated to being a leader in the hydropower industry.

My sincere thanks to all past and current HDC staff for their comments, candor, and color expressed during the personal interviews. As HDC and the districts we serve face the challenges of the future together, I am confident we will continue to provide valuable economic, environmental, and social benefits to the Nation.

Essayons,



Brent L. Mahan
Director, Hydroelectric Design Center

PREFACE

The Portland District would like to express sincere thanks to the Hydroelectric Design Center's current and retired employees who participated in the oral interviews taking the reader through seven decades of experience. The history began with a request for several interviews, but expanded into a much more valuable project recording thirty-eight interviewees, capturing work experiences relating to the many projects blended with personal stories.

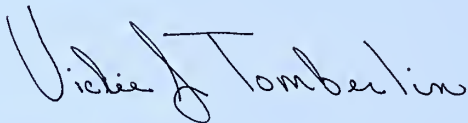
The district especially thanks Ms. Lisa Mighetto, Historical Research Association, for her exceptional writing ability and the fortitude to complete fourteen group oral interviews in three days.

We would also like to thank Dr. John Lonnquest, Office of History, for his work with Vickie Tomberlin, to produce the Hydroelectric Design Center's first history.

The district extends a special acknowledgement to Ms. Stefanie Baird for her diligent effort and numerous hours researching and proofing the history and the oral interviews. Ms. Baird's extensive experience and long service to the center made her a valuable asset to completing the project.

The Portland District would like to end with the recognition of Ms. Carol Hastings, of the Portland District Visual Information Branch, for designing the book. Ms. Hastings' exceptional talent, professionalism and creativity are evident on each page.

All photographs, maps, and illustrations are from the U. S. Army Corps of Engineers unless otherwise credited.

A handwritten signature in black ink that reads "Vickie Tomberlin". The signature is written in a cursive style with a large, stylized 'V' at the beginning.

Vickie Tomberlin
History Program Manager
Northwestern Division

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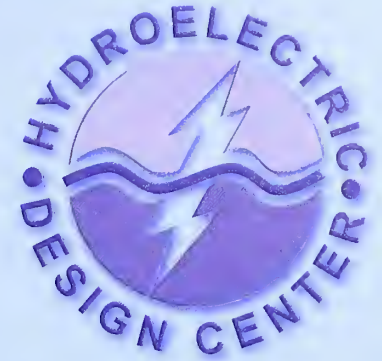


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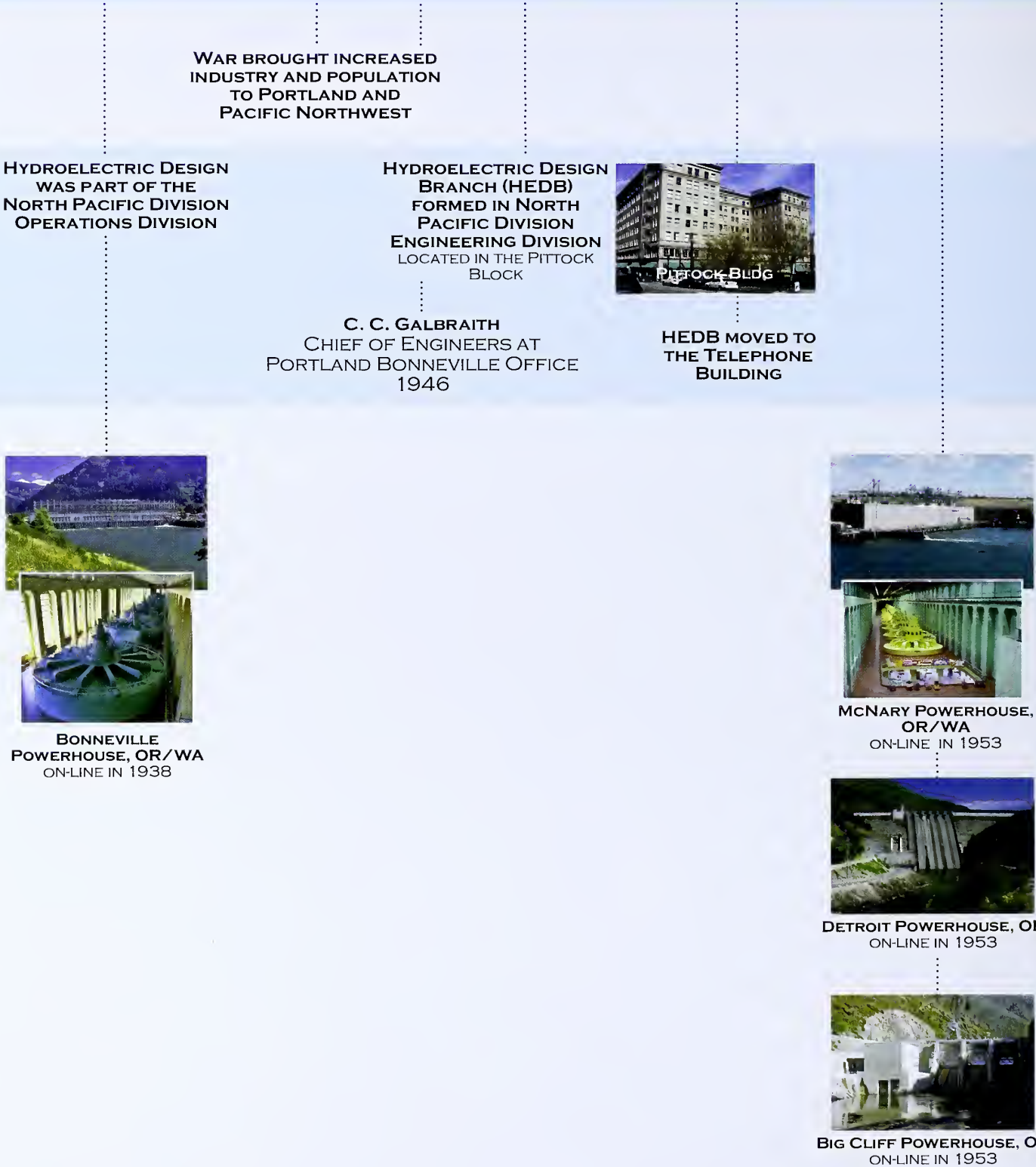
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MILESTONES OF HYDROELECTRIC DESIGN

1938 1941 1948 1950 1953



1955

1956

1957

1962

1963

**HEDB MOVED TO THE
FEDERAL RESERVE
BANK BUILDING**

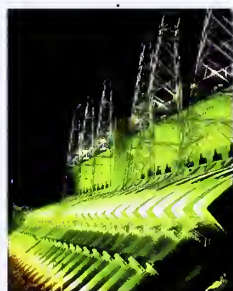


ROBERT SCHUKNECHT
CHIEF 1958 - 1964

LARRY FISHER
CHIEF 1964 - 1967



**LOOKOUT POINT
POWERHOUSE, OR**
ON-LINE IN 1955



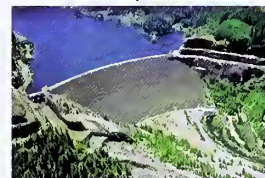
**CHIEF JOSEPH
POWERHOUSE, WA**
ON-LINE IN 1956



**THE DALLES
POWERHOUSE, OR/WA**
ON-LINE IN 1957



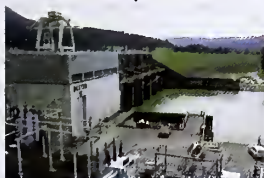
**HILLS CREEK
POWERHOUSE, OR**
ON-LINE IN 1962



**COUGAR
POWERHOUSE, OR**
ON-LINE IN 1963



**ICE HARBOR
POWERHOUSE, WA**
ON-LINE IN 1962



**DEXTER
POWERHOUSE, OR**
ON-LINE IN 1955

1964

1965

1966

1967

1968

FIRST CONTROL
COMPUTER
INSTALLED
IN A CORPS
POWERHOUSE
AT THE McNARY
PROJECT BUT
DEDICATED TO
AUTOMATIC
CONTROL OF THE
LOWER SNAKE
PROJECTS

ICE HARBOR
PROJECT BROUGHT
UNDER MANUAL
REMOTE CONTROL
FROM McNARY

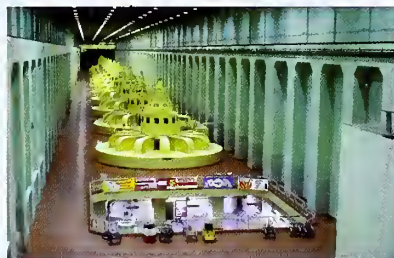
FIRST MAJOR
CORPS PLANT TO
BE BROUGHT UNDER
REMOTE CONTROL

ICE HARBOR
BROUGHT UNDER
REMOTE CONTROL
FROM COMPUTER
INSTALLED AT THE
McNARY PROJECT



ROBERT KRAHN
CHIEF 1967 - 1970

NEW CONTROL
CONCEPT
IMPLEMENTED
AT JOHN DAY
POWERHOUSE



McNARY POWERHOUSE, OR/WA



ICE HARBOR POWERHOUSE, WA



FOSTER
POWERHOUSE, OR
ON-LINE IN 1967



JOHN DAY
POWERHOUSE, OR/WA
ON-LINE IN 1968



GREEN PETER
POWERHOUSE, OR
ON-LINE IN 1967



1969

1970

1972

1973

1974

NATIONAL
ENVIRONMENTAL
POLICY ACT

FEDERAL WATER
POLLUTION
CONTROL ACT

ENDANGERED
SPECIES ACT

FIRST COMPUTER
DEDICATED TO
IN-PLANT CONTROL
BROUGHT INTO
SERVICE AT JOHN DAY

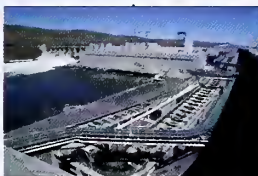


DON MACDONALD
CHIEF 1970-1980

START OF SMALL
HYDRO STUDIES
(AFTER THE FIRST GAS
SHORTAGE IN THE
1970's)



LOWER MONUMENTAL
POWERHOUSE, WA
ON-LINE IN 1969



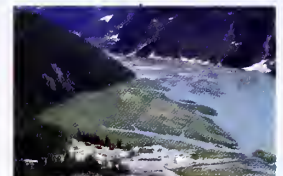
LITTLE GOOSE
POWERHOUSE, WA
ON-LINE IN 1970

LOWER MONUMENTAL
BROUGHT UNDER
REMOTE CONTROL
FROM McNARY

LITTLE GOOSE
BROUGHT UNDER
REMOTE CONTROL
FROM McNARY



THE DALLES
POWERHOUSE, OR/WA
ADDITIONAL UNITS
ON-LINE IN 1973



SNETTISHAM
POWERHOUSE, AK
ON-LINE IN 1974



DWORSHAK
POWERHOUSE, ID
ON-LINE IN 1973

1975

1977

1978

1979

1980

FIRST PC USED
IN WORK PLACE

START OF DESIGN
OF FISH BYPASS
SCREENS



CLEAN WATER
ACT

FIRST MAINFRAME
COMPUTER USED
FOR DESIGN WORK

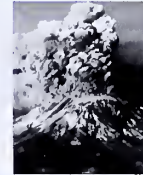


HEDB MOVED TO
CUSTOMS HOUSE

DESIGN OF FIRST
FISH BARGES
1979-1985



TRANSFERRED
NEW MELONES TO
BUREAU OF RECLAMATION



MOUNT ST HELENS
ERUPTION - 1980
PACIFIC NORTHWEST
ELECTRIC POWER
PLANNING &
CONSERVATION ACT



GLENN MELOY
DIRECTOR 1980-1993

HEDB BECAME
HDC



ICE HARBOR
POWERHOUSE, WA
ADDITIONAL UNITS
ON-LINE IN 1975



LOST CREEK
POWERHOUSE, OR
ON-LINE IN 1977



LITTLE GOOSE
POWERHOUSE, WA
ADDITIONAL UNITS
ON-LINE IN 1978



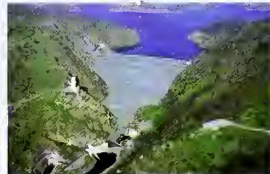
LOWER MONUMENTAL
POWERHOUSE, WA
ADDITIONAL UNITS
ON-LINE IN 1979



LOWER GRANITE
POWERHOUSE, WA
ON-LINE IN 1975



LOWER GRANITE
POWERHOUSE, WA
ADDITIONAL UNITS
ON-LINE IN 1977



NEW MELONES
POWERHOUSE, CA
FOR THE BUREAU OF
RECLAMATION

LOWER GRANITE
BROUGHT UNDER
REMOTE CONTROL
FROM MCNARY



LIBBY
POWERHOUSE, MT
ON-LINE IN 1975



CHIEF JOSEPH
POWERHOUSE, WA
ADDITIONAL UNITS
ON-LINE IN 1977

1982

1983

1984

1985

1986

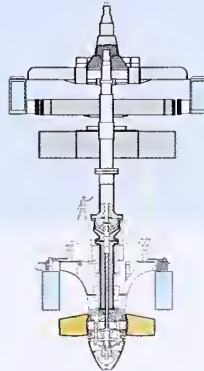
WATER RESOURCES
DEVELOPMENT ACT

HDC
ORGANIZATIONAL
STUDY COMPLETED

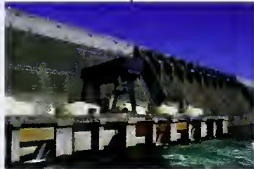
HDC Logo
CREATED

HDC FIRST USE OF
CADD

 **HYDROELECTRIC
DESIGN CENTER**



**BONNEVILLE 2ND
POWERHOUSE, WA**
ON-LINE IN 1982



**HARTWELL, GA
UNIT 5**
ON-LINE IN 1983
**FIRST MAJOR POWER
PROJECT OUTSIDE
PACIFIC NORTHWEST**

1987

1989

1991

1992

1993

**ENDANGERED
SALMON LISTING**



COHO



SOCKEYE



CHINOOK

**HDC BECAME
MANDATORY
DESIGN CENTER**

**MAJOR REHAB
PROGRAM STARTED**

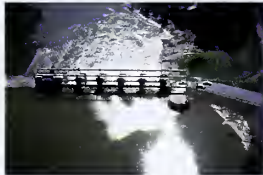
**DESIGN OF
MINIMUM GAP
RUNNER TURBINE**



**GREASELESS BUSHING
PROGRAM STARTED**



**POHNPEI ISLAND
POWERHOUSE,
FEDERATED STATES OF
MICRONESIA (FSM)
ON-LINE IN 1987**



**R.D. WILLIS
POWERHOUSE, TX
ON-LINE IN 1989**



**SNETTISHAM, AK
3RD UNIT
REHABILITATION STARTED**



**BONNEVILLE
FIRST POWERHOUSE, OR
REHABILITATION STARTED**



**HARTWELL, GA
REHABILITATION STARTED**



**DARDANELL, AR
REHABILITATION STARTED**



**COUGAR, OR
REHABILITATION STARTED**

1995

1996

1997

1998

1999



CURT FAULCONER
ACTING DIRECTOR
1993- 1995
DIRECTOR 1995-2001

HDC MOVED FROM
NORTHWESTERN
DIVISION TO
PORTLAND DISTRICT

CONVERTED FROM
COEMIS TO CEFMS

HDC
REORGANIZED
INTO REGIONAL
BRANCHES

ATLANTIC
BRANCH

CENTRAL
BRANCH

PACIFIC
BRANCH

HDC STRUCTURE

GENERIC DATA ACQUISITION AND
CONTROL SYSTEM (GDACS) TEAM
FOUNDED - 1996



OZARK, AR
REHABILITATION 1994

ENDANGERED
SALMON LISTING



CHUM



STEELHEAD



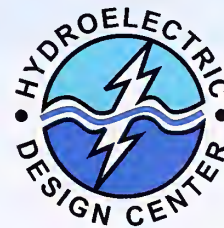
HDC MOVED TO
ROBERT DUNCAN PLAZA

ENGINEERING-IN-TRAINING
PROGRAM RE-ESTABLISHED

CREATION OF
FORWARD OFFICE IN
MOBILE ALABAMA

BPA DIRECT FUNDING

NEW HDC LOGO
CREATED



2001

2002

2003

2004

2005

SEPTEMBER 11 TERRORIST
ATTACK ON WORLD TRADE
CENTER AND PENTAGON



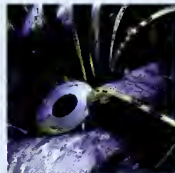
SUPPORT TO GLOBAL WAR ON TERROR AND
NATIONAL EMERGENCIES



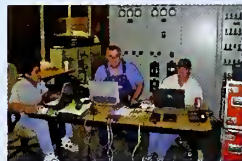
BRENT MAHAN
DIRECTOR
2001 - PRESENT

**HDC
UNIVERSITY
STARTED**

**NEW AERATING
TURBINE DESIGNED**



**TURBINE TEST TEAM
CREATED**



**HDC CERTIFIED
AS MANDATORY
CENTER OF
EXPERTISE
(MCX)**



**EVERGLADES
PUMPING STATIONS
COMPLETED**



**CHICAGO UNDERGROUND
STORM WATER PUMP
DESIGN WORK COMPLETED**



**J. STROM THURMOND, SC
AERATING TURBINE REHAB**

DEPLOYED TO AFGHANISTAN OR IRAQ



ELIZABETH HALL
2002 & 2003



**DUKE
LONEY**



LINDA TOMPKINS
2004 & 2006



**MARTIN MONNIG
& CLAY FOUTS**

**HDC BEGAN
WORK ON PUMPING
STATION PORTION
OF HURRICANE
KATRINA REPORT**

**HDC REORGANIZED
INTO FUNCTIONAL
BASED BRANCHES**

**PRODUCT
COORDINATION
(PC) BRANCH**

**HDC
STRUCTURE**

**ELECTRICAL (E)
BRANCH**

GDACS

**MECHANICAL/
STRUCTURAL (M/S)
BRANCH**

**TURBINE
TESTING**



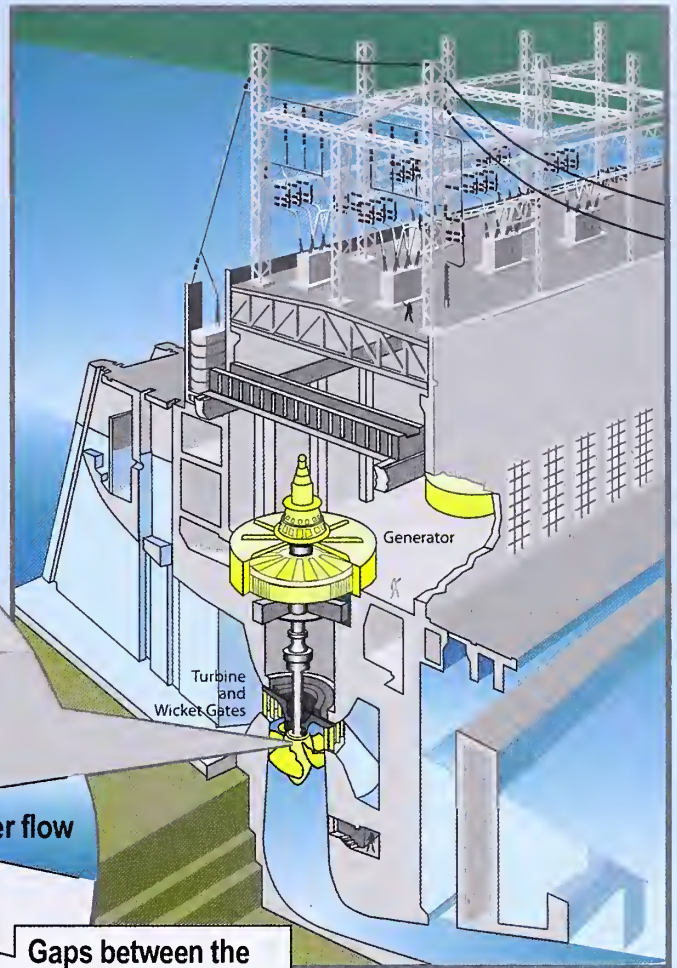
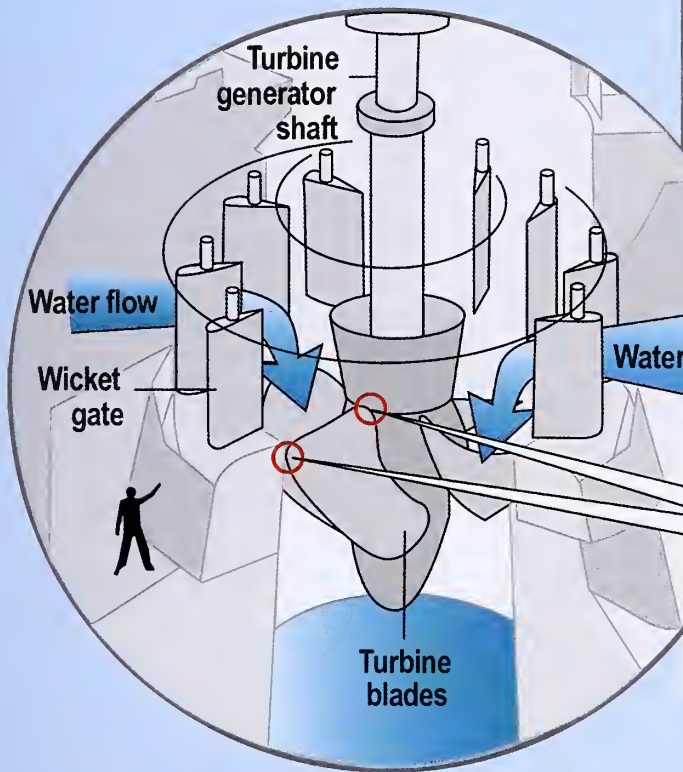
**HURRICANES
RITA, IVAN AND
KATRINA CLEAN-UP
PROJECTS**



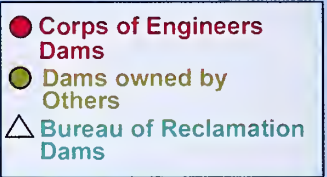
**GARRISON, ND
UNIT REHABILITATION**



**OZARK, AR
REHABILITATION**



Gaps between the turbine blades and the housing and turbine hub are smaller, so fish don't get trapped and killed as easily.



HISTORY OVERVIEW



THE EARLY YEARS 1938-1969

Much of the history of the American West was shaped by the absence or perceived abundance of water. It is no coincidence that the Hydroelectric Design Center (HDC) and its predecessor, the Hydroelectric Design Branch (HEDB), were based in Portland in the heart of the largest river system in the West. During the early twentieth century, the Columbia River Basin offered a potential for water resource development that was almost unprecedented in scale - and the story of HDC, recounted in the following pages, reflects the efforts to realize that potential.

A national conservation movement in the early twentieth century fueled the interest in hydropower. Its proponents sought to curtail the waste of natural resources while maximizing their efficient use for the long-term benefit of humans. Protecting natural resources would ensure a continued supply of materials for industry and the growth of communities in the future - objectives that could be reached through the construction of large multipurpose dams throughout the West.¹ In the mid-twentieth century, the HEDB emerged in the context of these values, which were very different from the tenets of environmentalism at the end of the twentieth century.

The groundwork for the era of big-dam construction was laid in the 1920s. Because the financial investment required for developing hydropower was considerable, the federal government proceeded where private interests foundered. In March 1925, Congress directed the U.S. Army Corps of Engineers to recommend navigable rivers across the Nation that could be studied further for their potential for irrigation, flood control, and water-power development. The following year, the Corps submitted a list of rivers in House of Representatives Document

308, which prominently featured the Columbia River and its tributaries. The Columbia River was especially appealing for development owing to its great volume of water and its rapid rate of fall - two to five feet per mile of flow. In subsequent surveys, the Corps recommended a ten-dam comprehensive plan for the Columbia River Basin, naming Bonneville Dam, located approximately forty miles east of Portland, as the lowermost in the chain. This plan would form the basis for Columbia River development for the next half-century.²

The HEDB can trace its origins to the construction of the Bonneville Dam and Powerhouse, completed by the Portland District in 1938. These were situated to take maximum advantage of the vertical fall, allowing for efficient operation of the large turbine-generator units, which could accommodate large quantities of water at low head. Each of the two original generators featured the Kaplan adjustable-blade propeller type of turbine.³

The completion of Bonneville Dam heralded a new era in the Pacific Northwest. The project, which generated employment during the Great Depression, supplied the inexpensive electricity that encouraged development of defense industries in the Columbia River Basin during World War II. The Bonneville Power Administration provided electricity to the Hanford Atomic Works near the confluence of the Columbia and Snake rivers. The availability of electricity also encouraged aluminum production and the shipbuilding industry, which attracted thousands of new residents to Portland and surrounding areas. By 1945, the influx of population further increased the demand for electricity, creating support for the construction of

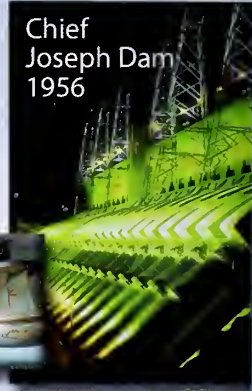
THE EARLY YEARS



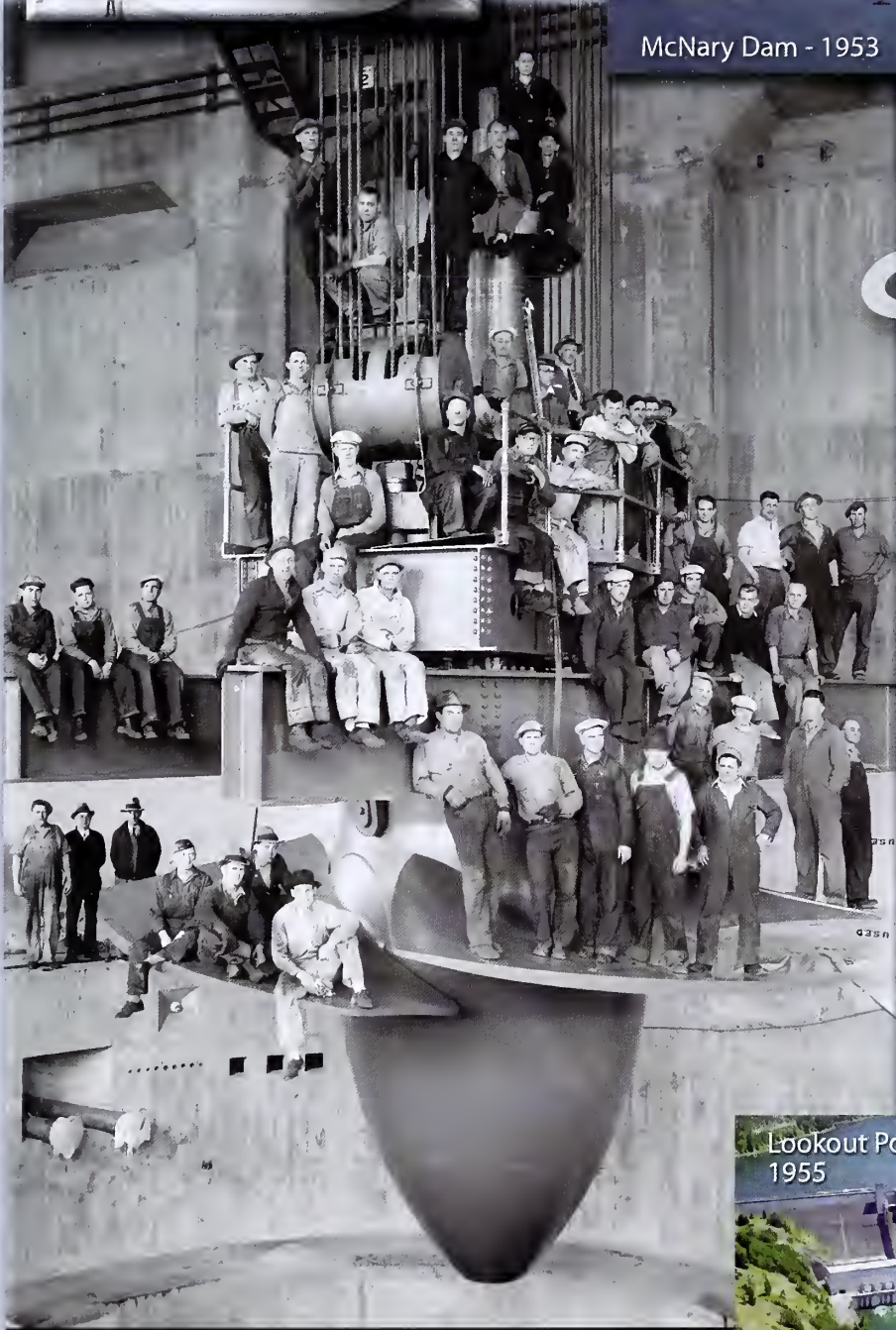
McNary Dam - 1953



Chief Joseph Dam
1956



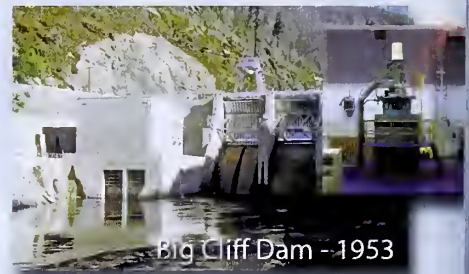
COLUMBIA RIVER



Bonneville Dam - 1937



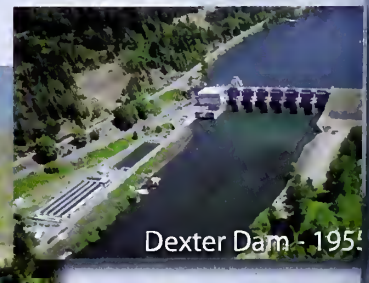
Detroit Dam - 1953



Big Cliff Dam - 1953



Lookout Point Dam -
1955



Dexter Dam - 1951



Cougar Dam - 1963

HYDROELECTRIC DESIGN BRANCH
FORMED IN THE NORTH PACIFIC
ENGINEERING DIVISION - 1948

- 1938-69



The Dalles Dam - 1957



John Day Dam - 1968



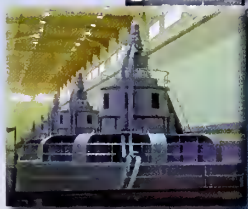
Lower Monumental Dam - 1969



Ice Harbor Dam - 1962



Under Remote Control from McNary Dam



Foster Dam - 1967



Green Peter Dam - 1967



Hills Creek Dam - 1962



Columbia River Basin

- Corps of Engineers Dams
- Dams owned by Others
- △ Bureau of Reclamation Dams

WILLAMETTE VALLEY



additional large dams and hydropower facilities along the Columbia and Snake rivers.⁴

The Corps established the HEDB in 1948 to support this development. Based initially in the Pittock Block Building in Portland, the HEDB was charged with designing powerhouses for the new dams. Bud Ossey, HEDB's first employee, explained the impetus for its creation. "This was right after the war, and there was a strong need for power in the Northwest," he recalled. "There was a prevalent threat of extreme shortages and military reasons that were developing in Europe. The Northwest was growing," and "aluminum was in big demand."⁵ Robert Krahn, another early employee and a former chief, observed the significance of HEDB's location, noting the "flow and head" of the Columbia River system and its potential to support large generating equipment that could supply massive amounts of electricity. "The Columbia had big units," he explained. "You get outside this area and there are not so many great big units. They become smaller. You're looking at kilowatts instead

of megawatts." He remembered a sense of awareness among employees of the significance of the new dams being constructed and the importance of HEDB's design work. "To be a part of that was really nice, and kind of fun."⁶

The HEDB operated as a branch of the Engineering Division under the North Pacific Division, also based in Portland. According to Krahn, "when HEDB came into being it was as... a design arm for the construction processes."⁷ The number of new projects and their size and scale kept the early staff busy for two decades. Bonneville Dam's construction was followed by completion of the McNary Dam in 1953 and the Dalles Dam in 1957, and work began on Ice Harbor Dam (completed in 1962), John Day Dam (completed in 1968), and Lower Monumental Dam (completed in 1969). [See Table 1 for a list of projects in the early years.] The North Pacific Division included the Portland, Walla Walla, Seattle, and Alaska districts, but much of the early work focused on the Columbia and Snake rivers.⁸

TABLE 1. EARLY PROJECTS (1938 -1969)

	STATE	INITIAL COMPLETION YEAR
1. Bonneville Powerhouse	OR - WA	1938
2. McNary Powerhouse	OR - WA	1953
3. Detroit Powerhouse	OR	1953
4. Big Cliff Powerhouse	OR	1953
5. Lookout Point Powerhouse	OR	1955
6. Dexter Powerhouse	OR	1955
7. Chief Joseph Powerhouse	WA	1956
8. The Dalles Powerhouse	OR - WA	1957
9. Ice Harbor Powerhouse	WA	1962
10. Hills Creek Powerhouse	OR	1962
11. Cougar Powerhouse	OR	1963
12. First Control Computer Installed at McNary Powerhouse	OR - WA	1964
13. Ice Harbor Under Manual Remote Control from McNary	WA	1965
14. Green Peter Powerhouse	OR	1967
15. Foster Powerhouse	OR	1967
16. John Day Powerhouse	OR - WA	1968
17. John Day New Remote Control Concept	OR - WA	1968
18. John Day First Computer Dedicated to In-Plant Control	OR - WA	1969
19. Lower Monumental Powerhouse	WA	1969
20. Lower Monumental Under Remote Control from McNary	WA	1969

And while the early powerhouses served as templates for the later facilities, HEDB employees recalled innovations in technology. Krahn, for instance, noted that “the control system for John Day was way ahead of its time.” The idea was that the powerhouse would be controlled remotely from McNary or The Dalles -- a novel concept that resulted in a distinctive plant design. The control room at John Day was built to be small, with no window overlooking the generator floor, and no main unit control boards. This control room was designed to serve as a way point for data that would be sent to the actual remote control point. The control system at John Day was finalized after the installation of a control computer at McNary, which could control Ice Harbor.⁹

RESPONDING TO ENVIRONMENTAL CONCERNS 1970 - 1983

The Corps entered what is now called the Environmental Era as an agency steeped in tradition -- one whose missions dated back centuries, long before “environmental impact statement” and “endangered species” had become common terms.¹⁰ The HEDB, as noted, began with a mission that was in keeping with the basic tenets of “wise use” conservation. But environmentalism was different -- and its emergence signaled nothing less than a new worldview. HEDB, like the rest of the Corps, had to adapt to new political conditions.

The environmental movement pressured Congress to enact legislation that would change the ways federal agencies approached water resource projects. The National Environmental Policy Act (NEPA) was the first to establish environmental protection as a national goal. Passed in 1969, it required federal agencies to adopt an interdisciplinary approach in evaluating their projects.¹¹ Similarly, growing public awareness and concern about water pollution led to enactment of the Federal Water Pollution

The early years of HEDB, then, were characterized by design of large construction projects, reflecting the values of the mid-twentieth century. The work on a single powerhouse could span more than a decade, as the process of moving from the design memorandum through the plans and specifications to construction sometimes took fifteen years. An employee could devote much of his career to a single project. And the Nation welcomed the inexpensive electricity generated by Columbia River powerhouses, providing HEDB employees a sense of contributing to the region’s growth and economic welfare.

Control Act of 1972. As amended in 1977, this law, which became known as the “Clean Water Act,” regulated discharges of water pollutants and granted the newly established Environmental Protection Agency (EPA) the authority to implement pollution control programs and to set wastewater standards for industry. Another landmark statute was the Endangered Species Act (ESA), which proved to have far-reaching significance for the HEDB’s work. Resulting from a growing awareness of the importance of biodiversity, it was the nation’s first comprehensive attempt to protect species from extinction.

The Pacific Northwest Electric Power Planning and Conservation Act also brought significant changes to the HEDB’s work, owing to its impact on fisheries management. Passed in 1980, this statute authorized the states of Oregon, Washington, Idaho, and Montana to create a policy-making body, called the Northwest Power Planning Council (NWPPC), for the long-term supply of energy. This interstate organization

had dual objectives: to assure the region of an adequate, economical power supply while protecting fish and wildlife in the Columbia River Basin. Of particular importance for the HEDB, the NWPPC outlined measures to mitigate losses and enhance the salmon and steelhead populations in the Columbia River Basin Fish and Wildlife Program, which directly affected the operation of the Corps' dams on the Columbia and Snake rivers. Salmon and steelhead are anadromous fish that hatch in freshwater, migrate downstream to the ocean, then return upriver to spawn in the waters of their birth. Accordingly, the Columbia River Basin Fish and Wildlife program included measures devoted to this complicated life cycle, addressing downstream

migration, ocean survival, upstream migration, and propagation.

Even before this point, the Corps recognized that its dams on the Columbia and Snake rivers presented a series of obstacles for salmon and steelhead. The agency installed fish-passage facilities for adults from the outset, beginning with Bonneville Dam in the 1930s. By the 1970s, however, awareness of the decline of salmon populations generally, and the mortality of juvenile salmon in particular prompted measures to aid young fish in their passage downstream. When research demonstrated that turbine blades injured migrating juveniles passing through turbine intakes, the HEDB assisted with the design and installation of submersible

TABLE 2. PROJECTS (1970 -1993)

	STATE	INITIAL PROJECT COMPLETION YEAR
COLUMBIA BASIN PROJECTS		
1. Little Goose Powerhouse	WA	1970
2. Little Goose Under Remote Control from McNary	WA	1970
3. The Dalles Powerhouse Additional Units	OR - WA	1973
4. Dworshak Powerhouse	ID	1973
5. Lower Granite Powerhouse	WA	1975
6. Lower Granite Under Remote Control from McNary	WA	1975
7. Libby Powerhouse	MT	1975
8. Ice Harbor Powerhouse Additional Units	WA	1976
9. Lost Creek Powerhouse	OR	1977
10. Lower Granite Powerhouse Additional Units	WA	1977
11. Chief Joseph Powerhouse Additional Units	WA	1977
12. Little Goose Powerhouse Additional Units	WA	1977
13. Lower Monumental Powerhouse Additional Units	WA	1979
14. Temporary Pumping Station, Mt. St. Helens	WA	1979
15. Bonneville Second Powerhouse	OR - WA	1982
PROJECTS IN OTHER LOCATIONS		
1. Snettisham	AK	1974
2. New Melones Dam	CA	1978
3. Panapei	Federated States of Micronesia	1987
4. R.D. Willis	TX	1989
5. Hartwell Unit 5	GA/SC	1993
FISHERIES PROJECTS (COLUMBIA & SNAKE RIVERS)		
1. Fish Bypass Screens		1975
2. Fish Barges		1980s

traveling screens that served as a barrier to turbine entry, protecting young salmon. Soon, this turbine bypass system was combined with a transportation system that barged the juvenile fish to downstream locations. HEDB engineers designed the barges, which featured a water circulating system that allowed the fish to imprint, (acquire homing capabilities so that adult salmon are able to return to their river of origin to spawn), during their trip downriver. The barges had the capacity to carry 50,000 pounds of fish.¹²

Employees recognized this work as a new direction for HEDB and later, for HDC. Jan Leader, for example, recalled that while initially she did not expect to be working on traveling fish screens, “we did those for years and years and years.” As she remembered, “it kept us busy for a long time. A lot of money went into it.” Don Trotter, another employee, welcomed the challenge, noting that the barges represented “an interesting departure from land-based facilities.” He explained that this was a collaborative process, with Corps engineers working with scientists from the Corps and other agencies. “The biologists would come up with a theory and we’d implement some way to take care of that theory,” he noted. “It was really outside the box we’d been used to working in.”¹³

Other employees similarly recognized that HEDB’s mission expanded during the 1970s and early 1980s to include environmental concerns. Bud Ossey recalled that in the first two decades “we weren’t that concerned with the environment and the effect on the landscape and surrounding area,” but “we were made aware of the deficiencies we had in our early days of construction of the projects.”¹⁴

While HEDB incorporated environmental work into its program, construction of many new powerhouses also proceeded during this era. [See Table 2 for a list of projects.] One project of particular interest was the Dworshak Dam, located on the North Fork of the Clearwater River in Idaho. The powerhouse, completed in 1973, featured two 90,000-kilowatt generating units and one 220,000-kilowatt generating unit and

demonstrated the challenges presented by a large high-head dam that measures 717 feet in height.¹⁵

The Libby Powerhouse, completed in Montana in 1975, proved to be another noteworthy project. Its location in a scenic area on the Kootenai River encouraged the design team to devote considerable attention to aesthetics, which presented some engineering challenges. Paul Thiry, a prominent Northwest architect who served as a consultant on the project, requested the use of pre-stressed concrete beams from the dam face to the powerhouse, to enhance the perception of form. He also wanted to maximize the visual exposure of the electrical equipment, requesting that the main unit circuit breakers be housed in glass enclosures, to give the public an idea of how the system operated in service. Thiry further requested that a microwave antenna be installed inside a tower rather than on the top, where it would be visible. As a result, engineers installed a half-inch fiberglass panel that enabled the antenna to receive microwave energy without being exposed to public view.¹⁶

For Glenn Meloy, an early employee and former director, the Libby Dam held the distinction as “the only project that the Corps gave an architect carte blanche and we didn’t do anything unless he approved.” As a result, “there isn’t a square angle in it,” making it difficult to install equipment. “It has even more flamboyant colors in it than the Bonneville Powerhouse does,” he marveled. “You know, a real bright blue, dark royal blue.” He remembered that the architect requested special beams and lighting, to make the project “appear more massive.” As Meloy summed up, it was “a real headache for a designer.”¹⁷

During the 1970s and early 1980s, the HEDB also constructed powerhouses in locations outside the Columbia River Basin. Hartwell Unit 5, located on the border of Georgia and South Carolina, became the HEDB’s first project outside the West. Other projects included the Snettisham Powerhouse in Alaska, significant because it was an underground facility, and the New Melones Project in California, the powerhouse which was

RESPONDING TO ENVIRONMENTAL CONCERNS - 1970-83

NATIONAL ENVIRONMENTAL POLICY ACT - 1970

FEDERAL WATER POLLUTION CONTROL ACT - 1972

HDC EVENTS



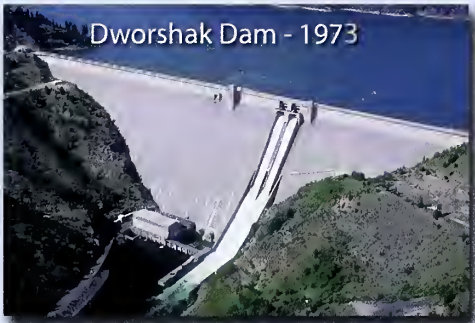
Little Goose Dam - 1970



Under Remote Control from McNary Dam



FIRST PC USED IN WORK PLACE - 1975



Dworshak Dam - 1973

DESIGN OF FIRST FISH BYPASS SCREENS - 1975



Ice Harbor Dam - 1975



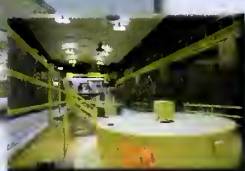
Lower Granite Dam - 1977



START OF SMALL HYDRO STUDIES - 1973



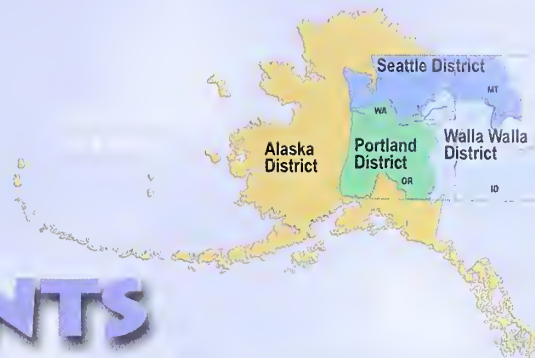
Snettisham Powerhouse - 1974



Libby Dam - 1975



Lost Creek Dam - 1977

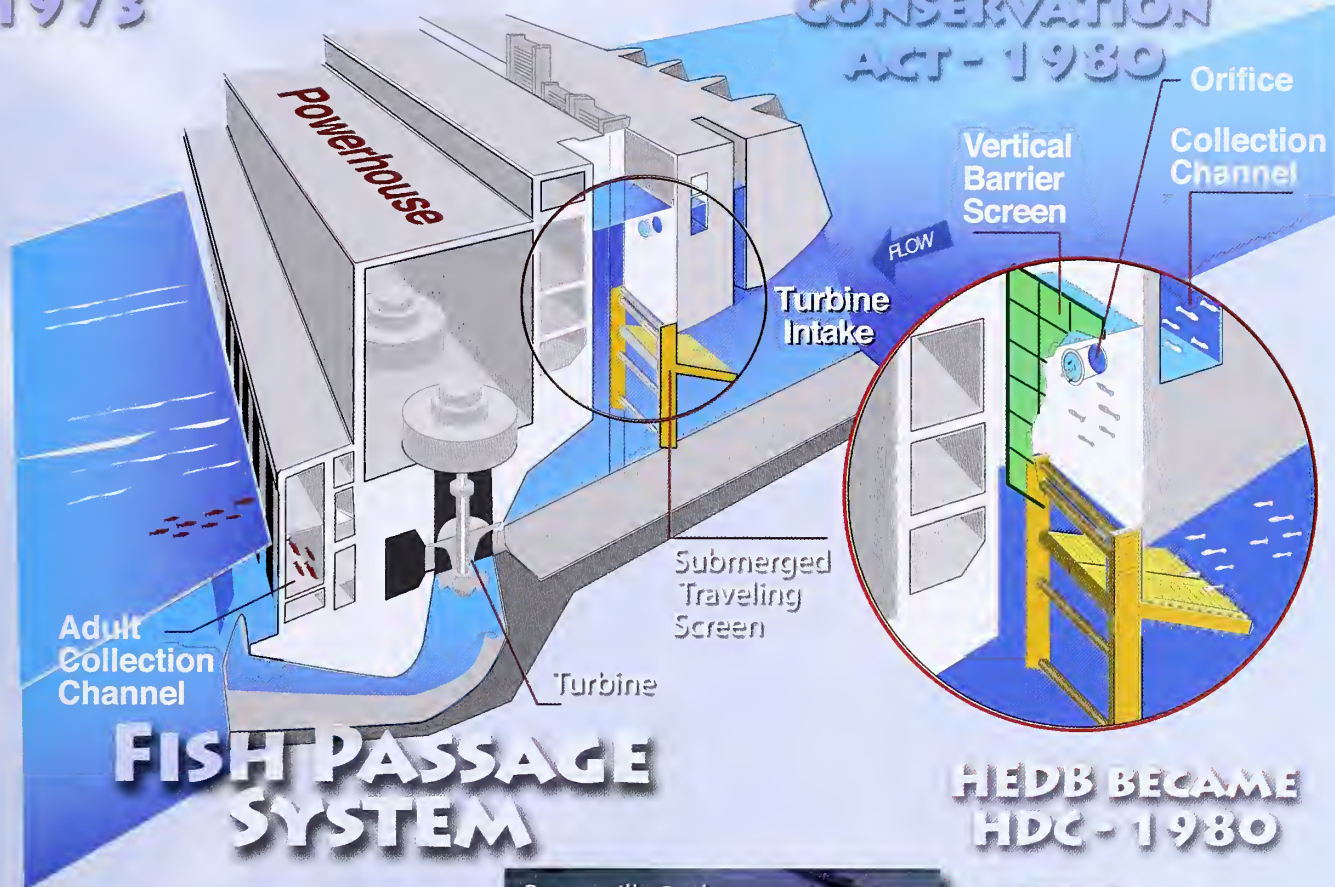


NATIONAL EVENTS

**ENDANGERED
SPECIES ACT
1973**

**CLEAN WATER
ACT - 1977**

**PACIFIC NORTHWEST
ELECTRIC POWER
PLANNING &
CONSERVATION
ACT - 1980**



**HEDB BECAME
HDC - 1980**



**DESIGN
OF FIRST
FISH BARGES
- 1979**



completed in the early 1970s, and transferred to the Bureau of Reclamation in 1978.

One of the most significant projects was also the HEDB's last large construction project: the Second Powerhouse at Bonneville Dam. The populations of Oregon and Washington had nearly doubled during the last three decades of the twentieth century, increasing the demand for power. Furthermore, the existing system at Bonneville - now the smallest powerhouse on the Columbia River - could not utilize all available water for power generation, prompting the need for a second powerhouse. This project presented a number of physical and social challenges. First, the site selected was located on the 800-year-old Cascade slide, much of which had to be moved. Second, several miles of railway track and highway had to be relocated, as did the town of North Bonneville. Archaeologists unearthed an Indian settlement noted in the journals of Lewis and Clark. The site had to be excavated. The project featured a fish-passage facility that included a fish ladder for adult salmon and a downstream bypass system for juvenile fish. So extensive was the Second Powerhouse project that at its peak the Corps employed 1,500 workers. Completed in 1982 at a total cost of approximately \$640 million, the Second powerhouse featured ten generators that more than doubled the earlier facility's capacity.¹⁸ Completion of the Bonneville Second Powerhouse signaled the end of an era. Even the

dedication ceremony acknowledged that it would likely be the last project of its kind.¹⁹ "The days of units the sizes of Grand Coulee, The Dalles, etcetera, are over in the U.S.," explained Robert Krahn. "There just isn't anyplace that will let you build that size dam."²⁰ As a result, the early 1980s marked the beginning of an era focused on maintenance and repair engineering on existing facilities rather than design and construction of ever-larger new dams.

In recognition of the "declining workload" and "the need to concentrate available work in existing organizations to maintain expertise," the Hydroelectric Design Center (HDC) was formed in the North Pacific Division in 1980, with the Omaha and Mobile districts designated as secondary centers. The HEDB in Portland remained the nucleus of the design center, staffed with more than 100 engineers, architects, technicians, and draftsmen, some of whom had more than twenty-five years of experience in hydroelectric design. The Corps' districts were directed to utilize the design centers, which maintained "the expertise necessary to accomplish the objectives of minimum cost and time consistent with producing a quality product." Within the Corps, the HEDB had first priority for work except within the Missouri River and South Atlantic divisions, which utilized the secondary centers.²¹

ADAPTING TO NEW CONDITIONS 1984-2006

Throughout the 1980s, as it adapted to an increasing operations and maintenance workload and decreasing demand for new powerhouse design, the North Pacific Division investigated the design centers to determine the best way to provide expertise to the entire Corps. The Organizational Study, issued in 1984, resulted in several changes. First, the

name "HEDB", Hydroelectric Design Branch, changed to "HDC", Hydroelectric Design Center. Second, hydroelectric design was deemed the responsibility of the districts, not the divisions, and the districts were again directed to utilize the capabilities of the HDC. Third, the HDC maintained its alignment with the North Pacific

Division, a decision that the 1988 Streamlining Study reaffirmed.²²

While division management grappled with these organizational developments, advances in technology brought further changes to HDC and the nature of its work. The first personal computers appeared at HDC during the early 1980s, and by the 1990s, almost all employees had their own, allowing them access to a staggering amount of information and computer programs once restricted to managers only. The introduction of Computer-Aided Drafting and Design (CADD) in the mid-1980s revolutionized design work, greatly reducing the numbers of hours required to produce drawings once completed by hand. Although changes in technology increased the efficiency of HDC's work, the use of CADD and other computer programs required new skills and training.

Curt Faulconer, retired HDC director, witnessed the change from slide rules to computers within the organization's operations. "We were always fairly progressive about moving to computers," he explained. "We could see that that was the way the industry was going to go, and we just stayed right there. We moved ahead as fast as we could to get everybody computers, and get them using them." Faulconer described HDC's process of maintaining the state-of-the-art equipment for employees who used CADD. "We knew we had to have them on the best machines. And so we set up ahead of time to bump their machines down to other people after a year or so and get them new machines. We explained it all to everybody so people, even if they didn't like getting a used machine, they at least understood the fact that we were money limited and that we had to make the best use of the equipment."²³

During the late twentieth century, the HDC continued to adapt as well to a changing political and regulatory environment. The Water Resources Development Act of 1986, for example, marked a major shift in the nation's approach to water resources planning. This legislation directed nonfederal interests to accept more of the financial and management burdens of water resources development, requiring a sound

economic basis for water resources projects and signaling a downturn in their construction. It also reinforced the idea that environmental considerations were integral to water resources planning, which had implications for HDC's work.²⁴

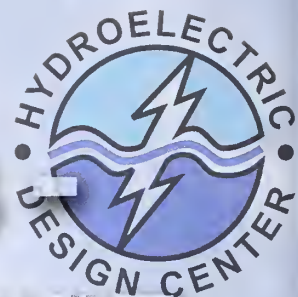
Another significant statute was the Energy and Water Development Appropriation Act of 1989, which mandated the expenditure of funds for the design, testing, and construction of fish-bypass facilities for the Columbia River Fish Mitigation projects. This work assumed a new urgency in 1991, when the National Marine Fisheries Service listed several species of Snake River salmon as threatened and endangered - and additional listings of salmon in 1999 reinforced the persistence of this issue. During the 1990s, the Corps devoted approximately \$100 million annually to mitigate the effects of hydropower operations on salmon populations.²⁵

This work engaged the HDC, particularly with regard to the operation of turbines in the powerhouses. Research at the Corps' Waterways Experiment Station in Vicksburg revealed that gaps between the blades and hub of a turbine injured young fish and proved more harmful than the blades themselves. The discovery promoted the design of the new Minimum Gap Runner that eliminated the size of the spaces by lengthening the blades and tilting them at a steep angle. As an added benefit, research suggested that the new design could increase power generation as well as save fish. The new device, designed in consultation with HDC's contactor, Voith-Siemens, was successfully installed at Bonneville's First Powerhouse as part of a rehabilitation project in the late 1990s. The Corps also developed a Turbine Passage Survival Program in coordination with a Turbine Working Group to design short-term improvements for the passage of juvenile salmon through its dams.²⁶

The process of reorganization that began in the 1980s extended into the 1990s, continuing toward more effective and efficient operations. This effort included developing centers of expertise. With the downturn in new construction projects, the Corps determined that not enough work

ADAPTING TO NEW CONDITIONS

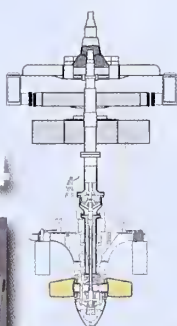
THE CHANGING WORK ENVIRONMENT



WATER RESOURCE
DEVELOPMENT ACT - 1986

ENDANGERED
SALMON LISTING
1991 & 1999

HDC FIRST USE
OF CADD - 1984



BEGINNING OF
MAJOR REHAB
PROGRAM - 1993



DESIGN OF
MINIMUM
GAP RUNNER
TURBINE -
1993

Bonneville Rehab



Hartwell Rehab



Cougar Rehab



Snettisham Rehab



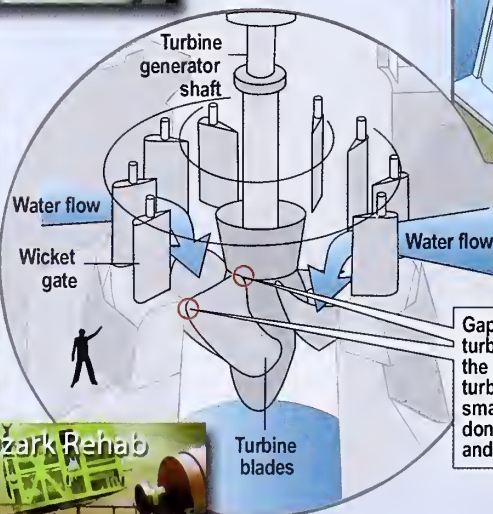
Pohnpei Island 1987



Dardanelli Rehab



Ozark Rehab



Gaps between the turbine blades and the housing and turbine hub are smaller, so fish don't get trapped and killed as easily.

HDC STRUCTURE

ATLANTIC BRANCH — CENTRAL BRANCH — PACIFIC BRANCH

HDC STRUCTURE

NATIONAL EVENTS

Northwestern Division



SEPTEMBER 11 TERRORIST
ATTACKS ON WORLD
TRADE CENTER & PENTAGON
2001

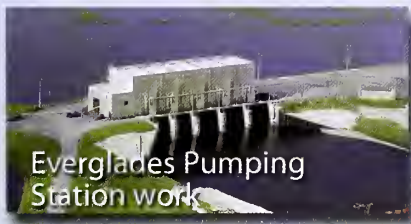


SUPPORT TO GLOBAL
WAR ON TERROR &
NATIONAL EMERGENCIES
2003-2006

HDC EVENTS

BPA FUNDING
1998

CREATION OF
FORWARD OFFICE
IN MOBILE ALABAMA
1998



Everglades Pumping
Station work

HDC MANDATORY
CENTER OF EXPERTISE
2001



TURBINE TEST
TEAM - 2002



Deployed Engineers
to Iraq or Afghanistan

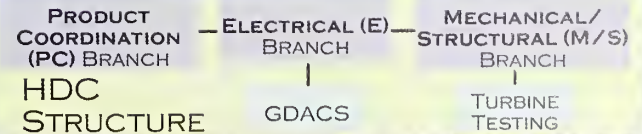
NEW AERATING
TURBINE DESIGN
2002



MGR at Bonneville



WORK ON PUMPING
STATION FOR
HURRICANE KATRINA
REPORT - 2005



HDC RESTRUCTURING

existed to justify maintaining three hydroelectric design centers. Because many of the Corps' major dams and powerhouses are located in the Columbia River Basin, the North Pacific Division HDC was selected as the sole hydroelectric design center in 1993.²⁷

Ron Stringfellow, a senior mechanical engineer who now leads the Mobile Forward Office, agreed with the concept of establishing a sole design center. The centers of expertise in Omaha and Mobile were experiencing diminished workloads, in part because funding was dependent on congressional appropriations and was not reliable. Furthermore, there was a "need for uniformity and consistency across districts," which a sole design center could more easily provide. After the closing of the design center in Mobile, however, the HDC in Portland continued to draw upon the powerhouse design expertise in the Mobile District.²⁸

The change in organizational structure to a regional team further allowed the HDC to handle a large rehab workload. The Major Rehabilitation Program began in 1993, when rehab projects began to be budgeted under Construction General and Flood Control, Mississippi River and Tributaries appropriation accounts.²⁹

The restructuring also resulted in HDC transferring from the division level to incorporation under the Portland District, which in turn became part of the new Northwestern Division, realigned to be larger in size and scope than the older North Pacific Division. Shortly after the HDC was integrated into the Portland District, it was named the National Center of Expertise. At that time, it remained structured by the engineering disciplines it contained, including structural, mechanical, and electrical.³⁰

By 1996, however, concerns about how best to serve customers that now spanned the entire country led to the creation of three regional branches: Atlantic, Central, and Pacific as well as a support branch: Technical Services. Under the Pacific Branch, an additional group developed: the Generic Data Acquisition Control System group, while the turbine testing group formed

under the Atlantic Branch. Subdividing the organization into three geographic branches with full-service design capability allowed for greater efficiency in producing products and in establishing and maintaining customer relations, and would result in better management of a workload that had grown to 200-300 jobs per year. Additional developments included the creation of a forward office in Mobile, Alabama, in 1998, to serve customers in the Southeast. The Mobile District had retained a sufficient number of engineers with hydropower backgrounds to warrant this decision.

That year, the HDC moved from the Customs House, where the Northwestern Division resided, to Robert Duncan Plaza, the headquarters of the Portland District. Employees noted the changes that accompanied this office move, along with the transfer from the division to the district. Don Trotter, for example, observed, "I think HDC was always kind of a free spirit . . . kind of their own entity." It was a big change "going from an independent agency that was responsible basically directly to the division, to an organization that was part of a large organization."³¹

The move toward efficiency and streamlining operations was strengthened by another development in the late 1990s: a new funding agreement with the Bonneville Power Administration (BPA). The BPA, which marketed and sold the electricity that Corps' hydroelectric projects generated in the northwest, was also responsible for covering the costs of operation, maintenance, and repair at Corps plants. These costs were funded by the federal budget process and then repaid by BPA at the year's end. In 1998, however, the BPA agreed to fund operation, maintenance, and repair costs directly, eliminating the delays that had occurred while waiting for congressional appropriations. The BPA also provided funding for capital investment to modernize the aging facilities.³²

By the early twenty-first century, the Corps had named the HDC a Mandatory Center of Expertise (MCX) for hydroelectric and large pumping-plant engineering services. Recent projects

include the Everglades pumping station, which delivers billions of gallons of water to a large artificial wetland that filters polluted water before it reaches the Everglades. In 2005, the Corps asked the HDC to assume the lead in assessing pumping station performance post-Hurricane Katrina, as part of the Hurricane Katrina Commission forensic analysis. *[See Table 3 for a list of projects.]*

As the HDC approaches its 60th anniversary, it continues to look for ways to increase its

efficiency and responsiveness to customers. In 2005 the agency once again began reorganizing and relocating staff. The new configuration now includes three branches: Product Coordination, Electrical, and Mechanical/Structural. These replace the Pacific, Central, Atlantic and Technical Services branches. The new configuration aligns with the Project Management Business Process and enhances HDC's ability to produce quality services and products, maintain technical expertise, manage work, and improve communication and customer support.

TABLE 3. REHAB PROJECTS (1992 - 2005)

	STATE	REHABILITATION CONSTRUCTION YEAR
1. Bonneville 1 (Powerhouse)	OR	1992
2. Hartwell Dam	GA	1992
3. Bonneville (Switchyard)	OR	1993
4. Dardanelle Dam	AR	1993
5. John H. Kerr Dam	VA	1996
6. Jim Woodruff Dam	GA - FL	1998
7. Garrison Dam & Powerplant (Powerhouse)	ND	1998
8. Buford Dam	AL	2000
9. The Dalles	OR - WA	2000
10. Walter F. George Lock & Dam	GA	2002
11. Cougar Powerhouse	OR	2003
12. Ozark Powerhouse	AR	2005
13. J. Strom Thurmond	GA	Not started
14. Garrison Dam & Powerplant (Switchyard)	ND	Not started
15. Whitney Lake Powerhouse & Dam	TX	Not started
16. Allatoona Dam	AL	Not started
17. Webbers Falls Lock & Dam	OK	Not started
18. Wolf Creek Dam	KY	Not started
19. Center Hill Dam	TN	Not started
20. Barkley Lock & Dam	KY	Not started
21. Old Hickory Lock & Dam	TN	Not started
22. Fort Randall Dam & Powerplant	SD	Not started
23. McNary Powerhouse	OR - WA	Not started

A CHANGING WORK ENVIRONMENT

During the half-century of its existence, the HDC continually responded to the growth of the Pacific Northwest and to changing congressional priorities. Its history has paralleled larger national trends, including the development of hydropower to meet increasing demand and a growing awareness of the environmental consequences of water resources development. But the HDC's story also includes the individuals whose day-to-day work lives were affected by the changes over time - and the following section describes how the office culture developed through the years.

Many HDC employees recalled their various office moves as significant, not for the temporary disruption but because the relocations brought permanent changes in their work lives. [See Table 4.] In the early days at the Pittock Block Building and Federal Reserve Building, for example, the work space for most employees included large drafting tables that served as a common area for employees, who worked side by side. A single telephone was available, and employees used that sparingly. Most people worked established, exact hours and many dressed in white shirts and ties. In brief, the work culture was formal but communal - and employees recalled a great deal of camaraderie. By 1998, however, when HDC moved to Robert Duncan Plaza, employees spent most of their days - when not working at project sites - in cubicles and offices. Each employee had a personal computer and a telephone, allowing for more direct communication with customers and others. This reconfiguration of office layout fostered both independence and, ironically, isolation, since employees' communications did not necessarily engage those sitting in nearby cubicles. Yet social interaction continued within the office, and new traditions such as "Hawaiian Shirt Friday" helped build camaraderie while also revealing an increasing informality in the work place, at least in terms of dress.³³

Changes in the size and composition of staff also affected employees' work lives. The HDC work force has fluctuated over time in response to workload shifts and reorganizational procedures. In the late 1970s, the employee base was at a fairly stable maximum of about 125 full-time staff, and decreased to a minimum work force of around 70 in the late 1980s. By 2005, the staff had included 82 full-time equivalent (FTE) government employees.

During the late twentieth century, the composition of the staff broadened to include more women and minorities. While HDC employees tended historically to be male and white, an effort to recruit a diversity of employees resulted in a workforce that included 30 percent women. "In general, I think they do better in some areas because it's a challenge to them," observed Jan Leader. "So I think they're a little more devoted sometimes. The ones we have gotten in HDC have been outstanding."³⁴

The staff also included more young people by the late twentieth century, resulting in a combination of experience levels and values. Mike Roll, HDC Deputy Director, noted that by 2005 HDC's work force spanned an unprecedented four generations of employees, from the pre-World War II population and Baby Boomers to "Generation X" and "Gen-nexters," born in the early 1980s. "And it does create an interesting demographic because they have different experiences, they bring different points of view, they bring different work

TABLE 4. HDC OFFICE LOCATIONS

Pittock Block Building	1948 - 1950
Telephone Building	1950 - 1956
Federal Reserve Building	1956 - 1978
Old Customs House	1978 - 1998
Robert Duncan Plaza	1998 - present

ethic, they bring different expectations to what a job is, what work is, what family life is, and how those different things mix together,” explained Roll. “It’s an excellent blend.”³⁵

With the younger generations entering the HDC workforce came a new generation of engineering, as well as new concepts of management, organization, and job efficiency. HDC Director Brent Mahan observed the changes that have occurred in the organization’s management and leadership over the past twenty to thirty years. “Historically, you would have had engineers in all of the major organizations within the Portland District,” he explained, “like the chief of operations, the chief of engineering and maybe even the chief of programs and project management.” In contrast, Mahan had a broader water resources background. According to Mahan, this transition involves moving toward a philosophy that focuses more on the importance of the organization’s managers having strong leadership skills and talents rather than detailed technical backgrounds.³⁶

Although HDC has hired a number of new and experienced engineers in recent years, many managers and employees have raised concerns about the aging engineering staff and the need to transfer their expertise to the new generation of workers. “In HDC, probably in the last five to six years, we estimate that about 50 percent of our staff is new, so that’s presented an interesting cultural dynamic, and an interesting demographic dynamic within the organization,” Roll explained. “Our efforts to fill that knowledge gap have been extensive over the past few years.”³⁷ To address this issue, HDC restarted their Engineer-in-Training program in 1998, and implemented “HDC University,” a volunteer program that provides instruction on various topics.

CONCLUSION

As it faces the twenty-first century, HDC plans to address the loss of senior engineers and their experience by recruiting and developing employees who have the technical skills to continue to offer state-of-the-art expertise in hydropower design as well as the social skills and leadership needed to establish and maintain good customer relations. These employees will need to draw upon the HDC’s tradition of adaptability, as they encounter continued reductions in federal budgets and alternate sources of funding. They will also need the flexibility to assume new roles, as HDC employees support relief efforts after natural disasters, and travel overseas to support the Global War on Terror. The HDC has come a long way since 1948 and its initial focus on hydropower in the Pacific Northwest - and all indications are that it will continue to play an important role in the region as well as the Nation.

ENDNOTES

- ¹ See, Samuel P. Hays, *Conservation and the Gospel of Efficiency: The Progressive Conservation Movement 1890-1920* (Pittsburgh: University of Pittsburgh Press, 1999).
- ² William F. Willingham, *Water Power in the Wilderness: The History of Bonneville Lock and Dam* (U.S. Army Corps of Engineers, n.d.), 1-3.
- ³ Willingham, *Water Power in the Wilderness*, 12-13.
- ⁴ Mary E. Reed, *A History of the North Pacific Division* (U.S. Army Corps of Engineers, 1991), 72; and William F. Willingham, *Army Engineers and the Development of Oregon: A History of the Portland District U.S. Army Corps of Engineers* (U.S. Army Corps of Engineers, 1983), 123.
- ⁵ Interview with Curtis Faulconer, Bud Ossey, and Mike Roll by Lisa Mighetto, April 29, 2005, Portland, Oregon.
- ⁶ Interview with Glenn Meloy and Robert Krahn by Lisa Mighetto, September 9, 2004, Portland, Oregon.
- ⁷ Meloy and Krahn interview.
- ⁸ Meloy and Krahn interview.
- ⁹ Meloy and Krahn interview; Personal Communication, Clayton Fouts, August 18, 2006.
- ¹⁰ Jeffrey Kim Stine, "Environmental Politics and Water Resources Development: The Case of the Army Corps of Engineers during the 1970s" (Ph.D. diss., University of California, Santa Barbara, 1984), 2-27.
- ¹¹ Stine, "Environmental Politics and Water Resources Development," 48.
- ¹² Lisa Mighetto and Wesley J. Ebel, *Saving the Salmon: A History of the U.S. Army Corps of Engineers' Efforts to Protect Anadromous Fish on the Columbia and Snake rivers* (U.S. Army Corps of Engineers, 1995), 118-23.
- ¹³ Interview with Jan Leader, Don Trotter, and Dave Raisanen by Lisa Mighetto, November 18, 2004, Portland, Oregon.
- ¹⁴ Faulconer, Ossey, and Roll interview.
- ¹⁵ Meloy and Krahn interview.
- ¹⁶ Personal Communication, Clayton Fouts, July 21, 2006.
- ¹⁷ Meloy and Krahn interview.
- ¹⁸ Todd Jennings, Lisa Mighetto, and Jill Schnaiberg, *Currents of Change: A History of the Portland District, U.S. Army Corps of Engineers, 1980 - 2000* (U.S. Army Corps of Engineers, 2003), 18-20.
- ¹⁹ "Dedication of Bonneville II Powerhouse," Bonneville, Washington, June 1, 1983, RG 77, Accession 77-91-0043, Box 2 of 2, Folder, "Dedications - Bonneville Second Powerhouse," Federal Records Center, Pacific Alaska Region.
- ²⁰ Meloy and Krahn interview.
- ²¹ Lieutenant General J.W. Morris, Chief of Engineers, "Hydroelectric Design Centers," memorandum, 25 August 1980, Document Provided by HDC, Portland, Oregon.
- ²² Summary, Hydroelectric Design Center, December 11, 1989, Document Provided by HDC, Portland, Oregon.
- ²³ Faulconer, Ossey, and Roll interview.
- ²⁴ Martin Reuss, *Reshaping National Water Politics: The Emergence of the Water Resources Development Act of 1986* (U.S. Army Corps of Engineers, 1991).
- ²⁵ Mighetto and Ebel, *Saving the Salmon*.

- ²⁶ Jennings, Mighetto, and Schnaiberg, *Currents of Change*, 128-32.
- ²⁷ Jan Leader, "Hydroelectric Design Center (HDC): History and Development," 2004, Document Provided by HDC, Portland, Oregon.
- ²⁸ Personal Communication with Ron Stringfellow, September 20, 2006.
- ²⁹ Guidance Major Rehabilitation Evaluation Reports, Fiscal Year 1996.
- ³⁰ Jan Leader, "Hydroelectric Design Center (HDC): History and Development," 2004, Document Provided by HDC, Portland, Oregon.
- ³¹ Leader, Trotter, and Raisanen interview.
- ³² Jennings, Mighetto, and Schnaiberg, *Currents of Change*, 191.
- ³³ Interview with Phil Gruwell, Tam Bui, and Steve Maness by Lisa Mighetto, November 19, 2004, Portland, Oregon.
- ³⁴ Leader, Trotter, and Raisanen interview.
- ³⁵ Faulconer, Ossey, and Roll interview.
- ³⁶ Brent Mahan, telephone interview by Lisa Mighetto, May 3, 2005.
- ³⁷ Faulconer, Ossey, and Roll interview.

GLOSSARY

AE, A/E	Architectural and Engineering
AIA	American Institute of Architects
ASME	American Society of Mechanical Engineers
BPA	Bonneville Power Administration
CADD	Computer-Aided Drafting and Design
COEMIS	Corps of Engineers Management Information System
CEFMS	Corps of Engineers Financial Management System
CG	Commanding General or Construction General (funding)
CRA	Columbia River Agreement
DOE	Department of Energy
DX	Directory of Expertise
EIT	Engineer in Training
EPRI	Electric Research Power Institute
ER	Engineering Regulation
FTP	File Transfer Protocol
FTE	Full-time Employment
GDACS	General Data Acquisition and Control System
GE	General Electric
GQAR	Government Quality Assurance Representative
HDC	Hydroelectric Design Center
HEDB	Hydroelectric Design Branch
JCL	Job Card Language
MCX	Mandatory Center of Expertise
MOU	Memorandum of Understanding
NMFS	National Marine Fisheries Service
NPD	North Pacific Division
NTE	Not to Exceed
OCE	Office of Civil Engineering
O&M	Operations and Maintenance
PC	Personal Computer
PM	Project Manager
PMA	Power Marketing Agency
PUD	Public Utility District
RDP	Robert Duncan Plaza
RIF	Reduction in Force
SEPA	Southeastern Power Administration
SES	Senior Executive Service
SWPA	Southwest Power Administration
TVA	Tennessee Valley Authority
WPA	Western Power Administration

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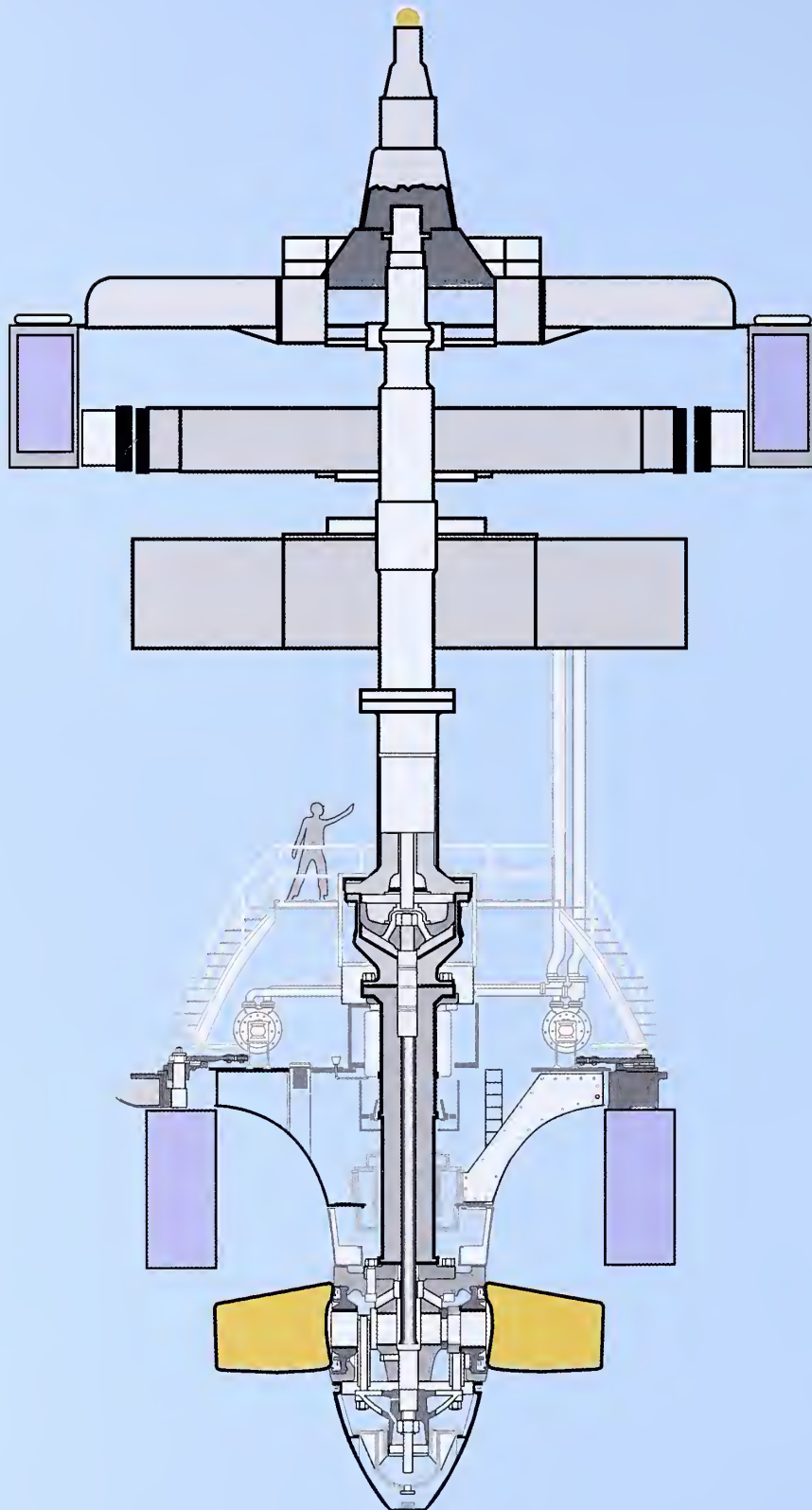
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EMPLOYEE INTERVIEWS

Interviewee: Glenn Meloy and Robert Krahn

By Lisa Mighetto

September 9, 2004

Portland, Oregon

Lisa Mighetto: Good afternoon. I suggest we start out by having both of you introduce yourselves briefly. Say your name and how long you've worked for the Corps of Engineers, and what positions you've held.

Glenn Meloy: Well, I'm Glenn Meloy, and I came to work for the Corps in, I think, June of 1958, and I retired in December of 1993. I came in directly from college as a trainee. I was on that for 18 months, and I traveled around the Division.

Lisa Mighetto: The North Pacific Division?

Glenn Meloy: The North Pacific Division. And then I went to work in the Power Section originally, and then I moved over in the Major Electrical Equipment Section, working for Bob Krahn. I moved from there to chief of the Electrical Section, and from there to the chief of HDC. I held that position for roughly 15 years.

Lisa Mighetto: Until you retired in 1993?

Glenn Meloy: That's right.

Lisa Mighetto: Okay, Bob.

Robert Krahn: I'm Robert (Bob) Krahn, and I came back with the Corps, I guess, back about 1949, in between my junior and my senior year in the University of Washington where I was going to school.

Glenn Meloy: That's Dave Bech Tech, former trustee of U.W. and Teamster Union president.

Robert Krahn: Right. But that was in between my junior and my senior year, and I had an opportunity - apparently there were some openings that were available for people who could come for summer. So I went ahead and applied for it, and I got it, and I spent that one summer - that was in the summer of 1948, I think, and this was the beginning, I guess, of my introduction to the whole system as far as the Corps of Engineers was concerned, and the Corps and everything they were doing.

Then I went back to school, of course, at the end of my senior year, and finally came back with the Corps in 1949. I went back into the Corps of Engineers in part of what was then the HEDB, we used to call it that



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back then – Hydroelectric Design Branch. Although at that time I think that probably everybody didn't call it that.

Glenn Meloy: Oh, yes, I think so, Bob.

Robert Krahn: You ask me so [?] things that happened a long time ago.

Glenn Meloy: Yes, because it was a branch of the Engineering Division, the North Pacific Division.

Lisa Mighetto: Okay, and this was in the 1940s?

Robert Krahn: This was about 1948 or 1949. I think 1949 was when I actually began working for the Corps full time as a trainee.

Lisa Mighetto: So you were both interns or trainees?

Robert Krahn: Well, we were – I think Glenn and I probably went through a little bit different type of a program. Mine was a little earlier than that, and they hadn't really set up this training program as great as they finally did.

Glenn Meloy: He didn't do that much training.

Robert Krahn: Yes, I didn't have to do any training. As a matter of fact, I spent most of my time running out to Bonneville Dam trying to maintain the generators out there and make sure they were still running.

So, anyway, I came back, and we started to get into the work of the Corps of Engineers and the hydroelectric business that was then about to be really "going to town" as far as the Corps was concerned and as far as the country was concerned, you know. It was quite a thing that they would develop, but that hadn't been done the way it should have been, I guess, in the world and in the country, you know. And so to be a part of that was really nice, and kind of fun.

Lisa Mighetto: To be a part of the beginning of it.

Robert Krahn: Well, sure – to me, anyway, it was the beginning. I hadn't been there before. I just came out of school, and there were some things that were going on that I enjoyed and liked, and so I stayed there. Matter of fact, maybe, like Glenn, I kind of stayed around a good while until I just progressed around to the various parts of the organization and so forth until eventually I ended up above – Glenn and I ended up pretty close to being together eventually, I guess. At one time, I was the chief and then he became the chief.

Lisa Mighetto: Of the hydroelectric design.

Robert Krahn: Of the Hydroelectric Design Branch, right.

Lisa Mighetto: When did you retire?

Robert Krahn: Again, well, you know, I'm not quite sure. I'll have to go back and look

at some information here and find out when I actually retired from the Corps. I finally moved from the Corps; I went with the Department of Energy.

One time, when I had gone through various stages of HEDB and so forth, I got to the point I was offered a position over in the Western Area Power Administration in Denver. So I went ahead – that was where I made the change, in going officially from the Corps of Engineers into the Western Area Power Administration with the Department of Energy.

Lisa Mighetto: Okay, so you actually moved.

Robert Krahn: I moved at least once, and a couple of other times along the way, too, when we would get through. There were, I guess, some other things, but that was the point at which I left the Corps. From then on, officially, it would be a part of the Corps.

Glenn Meloy: Still in the federal service.

Robert Krahn: Right.

Lisa Mighetto: Did you hire Glenn?

Robert Krahn: Well, no, I'm not sure I hired Glenn or not. He came on about when I was there. He was one of the group – there was a group of electricals – I don't know, this would be telling things out of story here, but you were a group of – your class, I think, that was interested in getting the work to the Corps.

Glenn Meloy: Yes. Larry Fisher actually hired me. Yes, that's right. But, you know, that time was a little different than now, and the interview – I interviewed Boeing and the State of Hawaii for Hawaiian Power Company and a few others around. I liked the Corps' challenges better and my wife liked the Hawaiian Islands better, and she gave me hell over that one.

Lisa Mighetto: Why did you like the Corps better?

Robert Krahn: The challenge. You had a lot more authority and challenges, I think, in the Corps at that time than anywhere else.

Lisa Mighetto: Can you describe the hydroelectric design, the HEDB did you say it was?

Robert Krahn: HEDB.

Lisa Mighetto: HEDB – in the early years?

Robert Krahn: We were busy. We were busy working.

Glenn Meloy: Yes. The general thrust of the organization was put together as a result of the so-called 308 Report, which identified all of the hydro work to be done in the coming years on the Columbia River.

Lisa Mighetto: So that's why it was located in Portland?

Robert Krahn: Yes, and so on the table was all of that stuff to be done. You know, John Day was built after that, The Dalles was

built after that, all of the Lower Snake plants were built.

Lisa Mighetto: Around the time you came on board?

Robert Krahn: Well, from there on for the next 20 years. So there were a lot of challenges that I was involved with, and a lot of challenges that people don't think of, such as the control systems that go in it. The control system for John Day was way ahead of its time, and it's a large control system.

Lisa Mighetto: Did HEDB service all of the districts?

Robert Krahn: Yes.

Lisa Mighetto: And it was located here because of all of the activity on the Columbia River?

Robert Krahn: The major activity was here at that time as far as construction was concerned, and HEDB was a construction design agency, essentially. That was the way it was set up.

Lisa Mighetto: So you actually did work outside of Portland?

Glenn Meloy: Oh yes. We designed, for instance, the powerhouse – now this is only powerhouses, but the New Melones project in California, the Hartwell project – I guess it's in Georgia. It's right on the line between Georgia and South Carolina. And we designed the Snettisham project in Alaska, and we've done a lot of stuff in the Southeast, and I can never

I interviewed Boeing and the State of Hawaii for Hawaiian Power Company and a few others around. I liked the Corps' challenges better and my wife liked the Hawaiian Islands better, ...

remember the names of all those projects.

Lisa Mighetto: Would you say the bulk of the work when you came on board – and we’re talking the early years. You were here in the 1940s and in the 1950s – was that on the Columbia then?

Robert Krahn: The Columbia had big units. You get outside this area and there are not so many great big units. They become smaller. You’re looking at the kilowatts instead of megawatts.

Lisa Mighetto: Is that because of the river size?

Robert Krahn: Sure. Directly related. Flow and head.

Lisa Mighetto: Okay. Are there any other major regional differences?

Robert Krahn: How do you mean regional?

Lisa Mighetto: Well, between the Columbia River and the other districts that you worked in, in terms of construction and technology.

Robert Krahn: The technology is the same.

Lisa Mighetto: They’re just smaller.

Robert Krahn: Just smaller.

Lisa Mighetto: Okay.

Robert Krahn: And there’s, you know, the last 20 years there hasn’t been any major large

construction. The days of units the sizes of Grand Coulee, The Dalles, etc. are over in the U.S. There just isn’t any place that will let you build that size dam.

Lisa Mighetto: When did that transition take place?

Robert Krahn: It started probably in the early 1980s. We never knew it was transitioning at that time. If you could foresee all that – but that’s what happened – you just run out of the big units to do and major powerhouses to construct, and so it needs changes.

Lisa Mighetto: How so? Did the need change from new construction to rehabilitation?

Robert Krahn: The construction took a long time. We were always under construction for many, many years.

Glenn Meloy: I think that the major thing that did change, actually – when HEDB came into being, it was primarily as an arm – a design arm for the construction processes. And, as those times changed, it became more of an organization that handled operations problems and maintenance and so forth; the design that goes with that. So your boss changes from construction management, or from your boss being the construction-type organization to the operation side of the house.

Lisa Mighetto: Okay. Is that when it became HDC?

Glenn Meloy: Yes, and I think that there were other things

involved in making that change, but there was a major change for the organization to do that.

Lisa Mighetto: Did the location change? I know it was in Portland, but you were not in this building right in the Robert Duncan Plaza.

Glenn Meloy: When I came to work for the Corps, and I think Elmer alludes to that – Bob, you were probably over in the Pittock Building.

Robert Krahn: . . . to begin with.

Glenn Meloy: It was independent?

Robert Krahn: And then, we went over to one of the old telephone buildings, and then went into the third floor of the Federal Reserve Bank Building. That lasted for 20 years.

Lisa Mighetto: Oh, okay. We’re looking at a photograph of the Federal Reserve Bank Building.

Robert Krahn: Right, and that’s where we were for about three or four years.

Glenn Meloy: Oh, more than that.

Robert Krahn: But the comment I made down there, now to get in the Federal Reserve Bank building was less secure than to get into this building. You go in down there and you go through the first stage in the back entry where you go, and there’s a little vestibule and they let you in

through the one and locked that door behind you, and you go to the next stage where you have to present your identification. And then, if you pass there, you can go ahead and go up to the third floor.

Lisa Mighetto: This was even before 9/11, right? It used to be a lot easier to get into this building.

Glenn Meloy: Well, 1958. I've been in this building many times and just walked in here.

Lisa Mighetto: So you're saying security was pretty tight.

Glenn Meloy: Well, I don't know how many millions of dollars or billion of dollars was laying in the vault over there in the Federal Reserve Bank. You can take tours down there and see all the money, but you can't take any out.

Lisa Mighetto: Now, you mentioned that your boss changed. The HEDB worked for the Corps, right, not for any other private utility?

Glenn Meloy: No, no. No, my comment about the boss, the boss didn't change. Over there, I still worked for the Engineering Division in the North Pacific Division as long as I was here, but I guess "your client changes" is a better statement, because instead of being the construction side of the house, it now becomes the operations side of the house.

Lisa Mighetto: But it's always the Corps.

Glenn Meloy: Yes.

Lisa Mighetto: Okay. So you don't work for outside agencies or private companies?

Glenn Meloy: No, not that. We did send some people over to China, and we sent some people over to Korea, but that was kind of unusual.

Lisa Mighetto: As advisors?

Glenn Meloy: Well, I never did fully understand the arrangement. They never did take the Corps seriously, over in Korea especially, or China. The Bureau was a little more aggressive than Corps of Engineers and the Koreans and Chinese like to deal with the chief. They don't want to deal with sub-organization and even though I would be the person that was calling the shots as to how their design got done, they wanted to talk to the Chief of Engineers.

Lisa Mighetto: So did you go to China?

Glenn Meloy: I knew better. But we sent some people.

Robert Krahn: I did. But that was during the war. I spent a year in China during the war.

Glenn Meloy: Oh, did you? I didn't know that.

Robert Krahn: Oh yes. I spent a year, after I got out of school. And then I went in – I signed over for an extra year, you know, because I had done all the training and so forth. So I got my commission, and then I figured I

wanted to spend a year. So, when I wanted to go overseas, I went back to the fleet for that year, and went to China by going all over the whole South Pacific, because some movements had been going on at that time of the year.

Lisa Mighetto: But that's before you came back to the Corps.

Robert Krahn: That was before I came back to the Corps.

Lisa Mighetto: Did they invite the Corps to China?

Glenn Meloy: Yes.

Lisa Mighetto: Okay.

Glenn Meloy: We actually built a project down in – I can't remember the island chain. I know it's about two-thirds of the way from Hawaii to Australia; let's see, it's a little island called Ponpei, and it was the part of the trust territories. But they had petitioned Congress for money to build a project over there, and then Congress said, "Well, no, we won't give you the money, but we'll get the Corps to build the project." So we got stuck with that.

That was kind of an interesting project, but it was different.

Lisa Mighetto: Did you go there?

Glenn Meloy: Two times more than I said I would.

Lisa Mighetto: What was the size of your staff in the early years?

Robert Krahn: About 120.

Glenn Meloy: Went up to as high as that, I guess, at times. It varied.

Lisa Mighetto: So that was the peak, 120?

Glenn Meloy: I think so. I think when we moved to the Customs House it was about 120. I don't know what it is today. I think when I retired it was about 85, which reflects not particularly the workload, but it reflects the changing attitude of the Corps. Instead of having a design center, they want to have the design do a portion of the work and contract out the rest.

Lisa Mighetto: And that's the more recent trend.

Glenn Meloy: Yes.

Lisa Mighetto: What was the staff comprised of? Mostly engineers?

Robert Krahn: Yes, primarily, mostly engineers.

Glenn Meloy: But there were varied disciplines involved, of course. We weren't all electrical engineers; we were mechanical engineers, we were structural engineers – all the utilities you had to have in order to design and arrange to construct a major project.

We had an office staff of, what, maybe eight people? But I think

– it must have been about eight people in the centralized front office. We had secretaries in each group, so if you had a letter to write or whatever, they could transcribe those. Actually, in the early days we handwrote them.

Lisa Mighetto: Imagine that!

Glenn Meloy: Wrote them by hand. At any rate, and then people in the front office would type them up and send them back out, whatever you wanted.

Lisa Mighetto: So eight people – is that because most of the people were out at the projects working?

Glenn Meloy: No, There was some travel . . . but most of the people were in the office.

Robert Krahn: This is Bob now. From time to time, as Glenn said, we stayed most of the time to do the work in the Office of HEDB, but other times during the construction, particularly, we would be out on the projects, watching construction, seeing what was going on, making sure it was done the way that we thought it was going to be designed and should be designed and so forth. So that was a continual thing. Whenever we had something happen that needed for us to know about or to go see or something, we went out to the projects and did it.

Lisa Mighetto: Okay.

Glenn Meloy: It would be several of us anyway.

Robert Krahn: Glenn went to some, and I went to many of them also.

Glenn Meloy: I think that's probably about right, as well as I can remember.

Lisa Mighetto: What were some of the major – the most significant projects that you remember during your time here? You mentioned John Day, because it had a technological advance.

Glenn Meloy: I kind of think that [the] Bonneville Second Powerhouse was probably the second highest. I'm not used to introducing myself. Of course, it was a later. I spent a lot more time at John Day, just due to where it was in the organization. We had a lot of work at the John Day generators, so I was up there a lot.

Lisa Mighetto: What was advanced about the technology at John Day?

Glenn Meloy: I think, the generators were advanced installation system, but I think the control system there today was ahead of its time. It may still be.

Lisa Mighetto: Was that design later copied in other projects?

Glenn Meloy: Yes, pretty much, as it got updated and everything else got updated. And at the time that started, one of the things I thought was neat about that organizational structure was the standardization that you could do from a centralized design organization that put

out the same design, and kept improving it so you didn't reinvent the wheel every time.

When the organizational structure changes to where you're dealing with a project manager project by project, then everything starts to diverge and you have a different system in each and every project. So, who's to say that's good, bad, or indifferent? – but I always thought it was good to have a common design as much as it would work.

Lisa Mighetto: When did that change start that you're talking about?

Glenn Meloy: In the mid-eighties, I guess.

Lisa Mighetto: Why is the Bonneville Second Powerhouse – you mentioned that as a significant project.

Glenn Meloy: Well, just the way it came about. You know, it culminates in all the knowledge that you have now, so it's the latest thing we did, so there's more than anything. If I had to pick one, I guess John Day because I had more personal involvement in it, but in reality, I think Bonneville is more up to date.

Lisa Mighetto: Okay. That was Glenn. Did you want to say anything, Bob, about significant projects?

Robert Krahn: Well, I go back a little bit further, earlier when I first came back to the Corps. Of course, then we were just

beginning on McNary. That was one of the first, then Bonneville, then McNary was the first biggie we got into, but it's been a number of years, of course, in actually getting McNary before you go on then into The Dalles project. You go to many of the others.

Glenn Meloy: Dworshak was another.

Robert Krahn: Dworshak was another one, and we had a whole lot of different smaller ones, there were a lot of different projects down in the Willamette Valley projects built, too, as part of the process, you know, of developing the whole center, both the Columbia system and also the Willamette Valley system.

Lisa Mighetto: How did you design the system on the river, the powerhouse, and did you look to other similar projects, or were there no other similar projects? When you were at McNary, for instance, how did you decide how to build that?

Robert Krahn: Well, to be really frank, a lot of McNary, when it first started – and it was way back when they were first really started getting into the development of the Columbia River – a lot of that work was very necessary for us to really get acquainted with the materials. Bonneville was the first big project that the Columbia River had in the area and a lot of that was carried over.

Then, when you get into the development of the whole river, then it expanded from that. Of

course, Bonneville was kind of the genesis of a lot of the original group that may have started way back at the beginning. It started out at Bonneville and was carried over, getting into the details of design on McNary. Then we went onto all the other projects.

Glenn Meloy: But I think that a lot that happened at Bonneville was just carried over, and to the degree that you could do it, you just copied what was there. And, you know, people are keeping up to date on things, or the latest things that could modify what you had before, but you don't start over.

Lisa Mighetto: Okay.

Glenn Meloy: Now, there's some funny things that happen. I think there's – at The Dalles there's an offset in a gallery, for instance, that has no reason for being there, but it was in McNary, and somebody didn't catch that it didn't need to be here.

Lisa Mighetto: And it didn't impact the performance, so it just – what did you call it?

Glenn Meloy: It's just a galley that goes down and it's a little lopsided like this.

Glenn Meloy: Those are the things that happen if you don't start from scratch, well, you're likely to have some . . .

Lisa Mighetto: An unnecessary feature that might have been copied from . . .

Glenn Meloy: Because the primary thing you're looking at

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is will it work, not does it have to be just this way, because there's nothing wrong with that offset, it's just probably if you took it from scratch, it would have been straight.

Lisa Mighetto: And there were no blueprints, right? You were mentioning that the projects here are distinctive in their size, so if there's no . . .

Glenn Meloy: Well, you know, they had drawings. They're stored in each and every project, so we can go look at what happened in a similar project – in this case, like Bob was saying . . .

Lisa Mighetto: On the Columbia.

Glenn Meloy: Right. McNary looked to Bonneville, I'm sure, for a lot of what they did. How did they do this?

Lisa Mighetto: How did Bonneville? What was the blueprint for that?

Glenn Meloy: I don't know. I don't know. It had a lot of innovative people.

Lisa Mighetto: Well, that was the thirties, so before . . .

Robert Krahn: That's right.

Glenn Meloy: A lot of things were different then.

Lisa Mighetto: What was the hydraulics lab?

Glenn Meloy: That had nothing to do with HEDB.

Lisa Mighetto: So you didn't work with them.

Glenn Meloy: They were out of Bonneville. Now, there's a hydraulics lab back in Vicksburg.

Lisa Mighetto: At the Waterways Experiment Station?

Glenn Meloy: Yes. They actually model a project, and you go back there, which I've been there several times, you know. That's not my bag, though. I'm an electrical engineer, not a civil [engineer]. But you've got a scale model to the project so they can tell what the flows are going to be in the river.

Lisa Mighetto: And that includes the powerhouse.

Glenn Meloy: Yes. Not to the degree of having a model unit in it, but it's more for hydraulic flow. Hydraulics details of a project – and don't ask me to explain that because I'm not a hydraulic person.

Lisa Mighetto: But HEDB didn't work with them very much, then.

Glenn Meloy: Well, our turbine people worked with them a lot, but I didn't, so I can't really speak to that. I was back there a couple of times and I can't remember what for. But I was there. But I can remember looking at the models they had of – you know, they had several models going on at one time.

Lisa Mighetto: Of Columbia River projects, or Corps-wide?

Glenn Meloy: Corps-wide. They were – actually, the Waterways Experiment Station is another sort of expertise really in a different arena. At least that’s the way I look at it.

Lisa Mighetto: Is this the only hydroelectric design center of expertise, or are there others around the country?

Glenn Meloy: In the Corps?

Lisa Mighetto: In the Corps.

Glenn Meloy: Now. There used to be one in Dallas, Texas, and where was the other one? Vicksburg?

Robert Krahn: Well, I’m not sure there’s one in Vicksburg. There’s one in Dallas.

Glenn Meloy: There was one in Dallas and there was another one that wasn’t in Vicksburg. It was in Mobile. That’s where it was.

Lisa Mighetto: But not anymore. Now it’s all centered in Portland.

Glenn Meloy: When HEDB was dedicated as a design center for the Corps, they shut down the other two and concentrated all the expertise in one area.

Lisa Mighetto: Do you know when that was?

Robert Krahn: Glenn was involved in that. The Corps was kind of winding down, and the other big projects had been constructed almost, so they were

beginning to say, where do you go from here?

Lisa Mighetto: Was this part of the shift to operations that you talked about earlier?

Glenn Meloy: I think it had more to do with the decrease in the workload per se as perceived, and needing to concentrate that expertise in one area, they would be able to maintain the expertise, because if you don’t do the work, you don’t keep knowledgeable of how to do it. And so that was just trying to concentrate the work in one area so you could keep up your expertise.

Lisa Mighetto: Okay. That was Glenn. Was there training to keep people . . .

Glenn Meloy: No.

Lisa Mighetto: So you didn’t have a training program?

Glenn Meloy: You mean as part of the HDC?

Lisa Mighetto: Right.

Glenn Meloy: That has just evolved, because the expertise was already there.

Lisa Mighetto: . . . for the future?

Glenn Meloy: Oh yes. Absolutely.

Lisa Mighetto: How did that work?

Glenn Meloy: Well, we run in trainees, too, as they did for me. We continued that process for

a long time, and as far as I know, it goes on today. And you can’t maintain the expertise unless you have somebody coming up from below that’s got a mentor up here, that’s been through that. So that’s really the only thing that a center of expertise has to offer is their expertise. You lose that and you lose the center.

Lisa Mighetto: Was there anything else you wanted to say about significant projects? Did we cover what you thought were the biggest, most important during your time here?

Robert Krahn: Well, I think if you looked at what you see in here, you’re going to find an awful lot of information on the many, many projects that were involved. It’s always amazing how many there were, to go back and try to count them now and remember them.

Lisa Mighetto: And this is the Columbia River, too.

Robert Krahn: That’s the Columbia River, too.

Lisa Mighetto: We’re pointing to the Portland District history.

Robert Krahn: That’s right, the Columbia River, too. Yes, the Columbia River.

Glenn Meloy: It’s kind of interesting, you know, I alluded to the business of standardization and the design standard. The generators and the turbines at John Day are identical, and I’m talking the first 14 units at John Day, the first three units

at Lower Granite, the first three units at Little Goose are identical, procured under the same contract, even though they were for different districts. That was presumably the economy of scale or purchasing.

Lisa Mighetto: Were there environmental concerns? Were you concerned at all about fish passage? I know that that sometimes gets . . .

Robert Krahn: We're laughing now.

Lisa Mighetto: . . . the minimum gap runner – I mean, turbines are designed, right, nowadays for fish passage, with fish passage in mind.

Glenn Meloy: Yes. You know, Hydroelectric Design Center designed the fish barges, for instance, and it had a lot to do with the various and sundry fish-passage facilities. But we're not on the firing line, per se. We just responded to what our clients told us they needed, you know.

Lisa Mighetto: Okay.

Glenn Meloy: We did a few other things like when St. Helen's erupted, we designed the pump station for Sprit Lake.

Lisa Mighetto: That must have been interesting.

Glenn Meloy: It was pretty rough there during that time. We had some folks that were up there working in the middle of all that was going on.

Lisa Mighetto: And they designed the fish barges, too. I didn't know that.

Lisa Mighetto: Well, we're back from a little break, and during that break you were talking about people, or you were about to say . . .

Glenn Meloy: I'm having a senior moment here now. I guess I forgot what my train of thought was.

Lisa Mighetto: You were talking about people, other significant individuals that stand out in your mind from working at the design center.

Glenn Meloy: Larry was – Bob, of course, is – you know, he's been around a lot and is well known in the industry, so I would put it up to him. Walt Russell did a lot for me as a mentor when I first came to work. I can remember one thing he told me about writing specifications. He started out and he said, "You know, say what you mean. There's a lot of difference between telling a woman she's a vision and telling her she's a sight." The thesauruses won't pick that up. That was – when he'd catch something that didn't say exactly what he thought it should say, he was very specific in doing it right the first time.

Lisa Mighetto: And you said Larry?

Glenn Meloy: Larry Fisher. He was the guy that hired me.

Robert Krahn: Larry hired me, too. The first time I came

down, the first interview when I first came down to look at that job, he interviewed me then.

Glenn Meloy: I guess you are the guy that really got me started in the heavy generator business. You also contributed to about 20 pounds around my middle that I have never lost. We spent some time at the Chief Joseph . . . and then two weeks on generator tests with nothing to do in the evening except go down to the local restaurant and have apple pie and ice cream. And it was what, 110 degrees ten days straight.

Lisa Mighetto: So you needed the ice cream.

Robert Krahn: That was the first trip you and I had made. That trip we went up to Chief Joseph and we tried to figure out how come we couldn't get the generators to run right.

Lisa Mighetto: When was this?

Robert Krahn: It was up at Chief Joseph, and that would have been 1958 or so.

Glenn Meloy: That was the time when we got out there and we got where we were out there watching the sky at night and so forth, and we looked up and we saw the Sputnik. You and I were talking about seeing the Sputnik.

Lisa Mighetto: So there was a lot of camaraderie.

Glenn Meloy: Oh yes. It wasn't necessarily a boss and employee relationship. We had

known each other as friends for a long time.

Lisa Mighetto: Was it that way among the other employees, too?

Glenn Meloy: I think a lot of it was.

Robert Krahn: Sure.

Lisa Mighetto: Bob, did you want to say anything about significant individuals that stand out?

Robert Krahn: Well, I can only say -- you mentioned some of the names. And of course it was Larry Fisher and Bob Schuknecht, who was in charge of our group at the time, and we actually came back . . . and Larry was the next one after that. He was the assistant for Bob Schuknecht . . . worked for Bonneville as well as what Bob Schuknecht had done. And, I don't know, people come and go through the years, but that's been a long time ago. It isn't something I remembered yesterday anymore.

Glenn Meloy: Well, you know, Bob, it's short-time memory that goes.

Lisa Mighetto: What was the biggest challenge, do you think, involved in your job?

Glenn Meloy: Mine is going to be different than Bob's.

Lisa Mighetto: And this is Glenn.

Glenn Meloy: I think the biggest challenge was translating the organization from an organization that worked on only half a dozen different large projects. That was their total funding, so that you maybe have six or seven different charge numbers that it should be charged to, because they had money to do that.

Lisa Mighetto: And the money came from the projects.

Glenn Meloy: Yes.

Lisa Mighetto: Okay.

Glenn Meloy: To a project that the average size -- and that might be a million dollars, say, to however many we had -- like two hundred and something, so the average size of a work order might be no more than \$50,000, maybe a lot that are \$10,000. How do you keep track of that? Because you know you blink an eye and you're over-budget. So that transition was a big one.

Maybe even bigger for me was the transition from being the organization that called the shots on design and how it should be designed. When you moved to operations, they tell you how they want it designed. You can make a case, but you're not the final authority, so that was a big change. It's a big change for the culture of the organization.

Lisa Mighetto: How did people generally handle that?

Glenn Meloy: Not very well. It took a long time. But I think they ultimately did it. But there

are people that I think mostly have retired now that never did make that switch.

Lisa Mighetto: So it was hard for them.

Glenn Meloy: Yes, and it created a lot of work for me because there were a lot of fires that I had to put out because people were going in all directions. That was not the direction to go. You didn't have to contend with that, Bob.

Lisa Mighetto: So what was your biggest challenge, Bob?

Robert Krahn: Well, I don't know. Evidently, that's a bigger challenge, of course. Being a young fledgling engineer and so forth, and getting involved in the sort of things that were going on in the Columbia River and then the big projects and so forth in this part of the country that was a very exciting thing for a young engineer. That was just about the time that Bonneville was being built, you know, for the power and control and navigation of the river. That was a big thing.

That was certainly -- you go back and think about now the things that were done, and it was amazing. I'm really amazed how we were able to do some of those things. But it's amazing not only did we do them, I guess that we did a pretty good job.

Lisa Mighetto: So you came back here after you went to Denver, to Portland.

Robert Krahn: No, I don't think so. I went to Denver. Let

me kind of go back and try to capitulate here where I am.

Glenn Meloy: Well, you never did come back to the Corps.

Robert Krahn: I never did come back to the Corps when I left, because about the time I went, then I got – we got involved with the Western Area Power Administration.

Glenn Meloy: But after you left there you went – didn't you go to work for that Canadian outfit?

Robert Krahn: Yes, for – well, that was...

Glenn Meloy: For a short period.

Robert Krahn: For a short period. There was a Canadian outfit, too, which wasn't engineering...

Lisa Mighetto: But you moved back to Portland.

Robert Krahn: Eventually. I spent a lot of time, of course, when I was with the – was there in Denver. I spent those couple of years there in Denver, and then I was out of the Corps after that because that was part of the Department of Energy. We got called up in different types of projects – steam plants and that sort of thing and so forth, and developing some of the other equipment like the converter equipment and a lot of the transfer of power... this part of the country back into California particularly. That was a big thing.

Western, of course, was trying to make this transition. Western was part of the system. It was just like... BPA, except they were operated in the Midwest where BP operated in the Northwest.

Well, let's see – I've got to go from here.

Glenn Meloy: Well, then you came back to CH2M Hill.

Robert Krahn: Well, after – yes, eventually, after we finished up.

Glenn Meloy: I don't know.

Robert Krahn: I did go back to CH2M Hill after – let me think. After I left Western, we finished the job with Western, so I went back to CH2M Hill, and then I came back to Salem and Corvallis is where we did a lot of work. But that was out of the Corps.

Lisa Mighetto: Yes, you brought several pictures. Do you want to talk about them and describe what they are?

Robert Krahn: Well, this happened to be the office I was at, at the time this one here was taken I was the assistant to the chief of engineering, I was the assistant. And this was my desk, and we were in the Custom House then, and that's where I was.

Lisa Mighetto: And you had more photographs, too.

Robert Krahn: Well, I don't know whether – here's one, for instance, that was kind of interesting. We had a group

after we got – so many of us got retired, and we went ahead and were doing... We had the old-timers group. We used to get together every month, or every other month, or at least every second month and so forth to have a luncheon, and particularly the people who were involved in this whole business of not only the Corps, but the whole Pacific Coast, I guess it is, in this part of the country and so forth. You notice on the back we had the names. That happened to be – that particular group there happened to be most of the HEDB.

Glenn Meloy: There's a couple there -- I noticed Don.

Robert Krahn: Here's me.

Lisa Mighetto: Do you guys still meet?

Robert Krahn: Yes. We had a meeting here last month or the month before.

Glenn Meloy: It's kind of a loose-knit group, and each time they pick another guy that's the victim to have to arrange for the next meeting. I did it last time, and then I ran off all the stuff for the people to use for the next meeting, which would be here.

Lisa Mighetto: Is it a lunch?

Robert Krahn: Yes, it's a lunch.

Glenn Meloy: A lot of times we've had it at Stanford's at the Lloyd Center. I had it at Stanford's right across from the Marriott. It was kind of

interesting how many people here have passed away.

Robert Krahn: That's right.

Lisa Mighetto: When was that taken?

Glenn Meloy: In 1999.

Lisa Mighetto: Five years ago.

Glenn Meloy: But since that time Don McDonald, who was my predecessor as the chief of HDC, has passed away; John Cline, he's passed away. He was the chief of our electrical group, our power group. I don't know about Don –

Robert Krahn: He was in operations at first.

Glenn Meloy: Yes, but I don't know whether he's still around or not.

Robert Krahn: I don't know. As a matter of fact – I guess I don't know for sure.

Glenn Meloy: Ken Laumond has passed away just recently.

Lisa Mighetto: But it must have been a close-knit group to continue to meet.

Glenn Meloy: Yes, it's kind of expanded, you know. It used to be that it got started, and we just had a meeting with the former chiefs of HDC. And then it kind of got expanded and we had others – that was a very small group, naturally, and it expanded to be anybody else that was retired from the Corps. So

we have expanded. I think the list now is 58 people. That's how many labels I ran off last night.

Lisa Mighetto: Really. And this was all HDC?

Glenn Meloy: No, not anymore. Not anymore.

Lisa Mighetto: Oh, that's what you just said. Okay, right. It's expanded.

Glenn Meloy: But normally it would be about 20-25 of us. They're adamant about not getting too much involved with e-mail because even though a lot of them have it, they don't check their e-mail regularly, so you have to send them an invitation.

Lisa Mighetto: What did you like best about your job, and what do you miss the most now?

Glenn Meloy: I don't know that I miss anything. I like the freedom of being able to do what I want to do, and I'm busy. I like the challenge, you know. I guess one of the things that when I retired I really intended to retire. I didn't intend to work. But I got phone calls from different people because you have a reputation, and I worked for Harza Engineering for a while.

Lisa Mighetto: As a consultant?

Glenn Meloy: Yes. And the thing that I guess I don't miss very much is the people problems. As an engineer, you move up the ranks and so forth, and you move out of engineering

into management, and then your people problems...

Robert Krahn: Begin.

Glenn Meloy: ... consume you. And I don't miss that at all. And, as a consultant, I could do the technical stuff that I like to do.

Lisa Mighetto: That's interesting. So were most of these people problems related to what you were talking about earlier, people who were trying to make that transition to the ...

Glenn Meloy: No, I don't think that was the problem. I think it was just ...

Lisa Mighetto: Routine personnel stuff.

Glenn Meloy: Just routine personnel stuff. You know, I had a suit brought against me one time, a reverse discrimination suit, because I promoted a woman instead of a guy and he thought he had been discriminated against. But he wasn't as well qualified.

I had the other side of the issue, an EEO complaint, that went all the way to Washington, and supported all the way, and our legal people decided to dump it.

Lisa Mighetto: They decided to ...

Glenn Meloy: They decided to cave in. And, as an idealist, that doesn't set well.

Lisa Mighetto: How many women did you have working for you?

Robert Krahn: Varied.

Glenn Meloy: Varied. Probably ten maybe. I never did count. I'm guessing ten, but more than that probably.

Lisa Mighetto: Engineers?

Glenn Meloy: Yes.

Robert Krahn: A number of civil engineers . . . doing - reinforcing drawings and this sort of thing.

Glenn Meloy: You know, the things you deal with, just to tell you, though. We had an engineer trainee, a graduate in civil engineering, female. She came into my office one day because she was going up to Chief Joseph on a construction project, and she wanted to know if it would be all right to wear a dress. Well, that's not something I need to deal with, you know.

Lisa Mighetto: So what did you tell her?

Glenn Meloy: Well, I told her if she liked to be stared at, why, go ahead. And if she wanted . . . why, that's up to her. I thought it was kind of stupid on her part to even ask the question.

Lisa Mighetto: So did she, do you know?

Glenn Meloy: I have no idea.

Lisa Mighetto: But you're saying that's the kind of thing you deal with in management.

Glenn Meloy: Did you ever have one like that, Bob?

Robert Krahn: Oh, yes. Remember Reba? Don't you remember Reba?

Glenn Meloy: Yes, I know who you mean.

Robert Krahn: She was quite a gal. She used to ride to work with me in a carpool. Anyway, she was a very interesting young lady.

Lisa Mighetto: Also an engineer?

Robert Krahn: Yes, she was an architect, yes.

Lisa Mighetto: So what did you like best about your job?

Robert Krahn: Her job?

Lisa Mighetto: No, your job.

Robert Krahn: My job. I think the people, are both. You look over the years and you think of many, many people you've run into and have associated with, and people you meet and you enjoy them, and then pretty soon they move on someplace and pretty soon you're moving on, too, and there's other people. But the people - if you have problems, as I say, you do have this. When you're young and you're doing engineering, it's fun, and pretty soon if you do get to the point where you become better because you get put up

the ladder a little bit, then you find out hey, it isn't fun anymore. You can't do the engineering you want anymore because you're busy with other things. And that's the thing . . . being in management, which is a more difficult job in my estimation than anything we had to do even in engineering.

Lisa Mighetto: Was there any training in management?

Robert Krahn: Well, it was automatic. I don't think there was any particular training other than what I guess anybody would have. You can't help but get training in any organization.

Glenn Meloy: The school of hard knocks - but once you're there or are knocking on the door to get there, you take courses.

Lisa Mighetto: So the Corps supported that?

Glenn Meloy: Oh yes. I well remember the one course I went to where the guy said, you know, managing engineers is like herding cats.

Lisa Mighetto: And you agreed?

Glenn Meloy: Absolutely.

Lisa Mighetto: So were these courses - they were outside of the Corps, then.

Glenn Meloy: Most of them, but not all. The Corps had some in-house. We hired a guy one time who was a management consultant to come in and spend like an hour or two a week with

our managers. He came in and talked about what he saw that we could better, and sometimes he had a good idea and sometimes he didn't, you know.

Lisa Mighetto: I was just going to ask, did he help or make things worse.

Glenn Meloy: Well, I think overall he made things better. But there were hits and misses. I think he had more hits than misses, but maybe not by a wide margin. But I think maybe he didn't have the hits per se, but the idea that the people had the course got them thinking about that. Maybe that was more important than . . .

Lisa Mighetto: I'm sure; the stuff they don't teach you in engineering school, right?

Glenn Meloy: Yes.

Lisa Mighetto: Well, is there anything that you would like to add about significant developments that we didn't cover, or any memorable experiences?

Robert Krahn: Glenn, how about maybe some of the work that we did on doing our excitation systems.

Lisa Mighetto: I'm sorry, what system?

Glenn Meloy: Excitation systems where – it has to do – I guess in terms that you might understand – with preventing something like the Great Northeast Blackout. Does that put it in perspective of what we're talking about?

Lisa Mighetto: Yes.

Glenn Meloy: The electrical stability of the power system as a whole, and the governor adjustments that went with that, which is not excitation systems but is what I did my Master's thesis on. And now, after I retired, I see that being paid attention to. So it's been a long time coming. But Bob spent a lot of time, and pulled me into it also, on the value of proper adjustment of excitation systems to benefit the system as a whole, as opposed to just the unit that it's on. And we actually built some supplemental units in our office to enhance that stability, and those are still in use today. GE picked up on it, and Westinghouse picked up on it, and built units that cost about 30 times what ours cost.

Lisa Mighetto: Oh, really? So they used that as sort of a prototype?

Glenn Meloy: They expanded on it.

Robert Krahn: . . . the whole technique has been used.

Glenn Meloy: Oh, yes, in a lot of places now.

Robert Krahn: . . . this thing that we had done at the same time to try and get . . . system to operate.

Glenn Meloy: It used to be that the so-called tie line between the Northwest and California or Arizona would periodically open up for whatever reason. And so, we've had some major studies about that. These things are now

You can't help but get training in any organization.. I well remember the one course I went to where the guy said, "you know, managing engineers is like herding cats".

taken in the limelight. There has been a lot more pressure put on the people that control money to make sure they operate.

Lisa Mighetto: So you were innovative in doing it. And when was this? You mentioned your Master's thesis was on this.

Glenn Meloy: I think, Bob, we really got started in 1965 on this, or thereabouts.

Robert Krahn: Yes.

Glenn Meloy: I'm surprised I can remember that. But I'm pretty sure it was around 1965.

Lisa Mighetto: Was security much of an issue? I mean, we talked about security in your building, but at the projects or the powerhouses?

Glenn Meloy: No.

Robert Krahn: No.

Glenn Meloy: I thought, you know, security as a result of 9/11 is over the top now to what it used to be, but like the people up at McNary – I don't know if you've – but they've gone, even before 9/11, had gone to a lot of trouble to monitor people who just might be out and around on the project just to make sure, or to know that there was someone there.

Lisa Mighetto: You mean like visitors, or contractors, or . . .

Glenn Meloy: Well, that, too, but people that weren't supposed to be there, and especially like some of the projects like Hills

Creek – small remote projects, where there's one operator on duty at night, and they had a few incidents where they had people showing up in the project, so they put in some surveillance equipment, more as protection for the operator more than anything else. But security had never been the issue that it is now.

Lisa Mighetto: And it was more to protect the people than sort of vandalism or sabotaging the project.

Glenn Meloy: Yes.

Lisa Mighetto: That's interesting.

Glenn Meloy: I don't know what their level is now. I took a tour through Bonneville here a couple of months ago. I called up and I thought I had the chance of a snowball in hell of getting through, but I talked to the people in security and explained who I was, and they took my family and a couple of other people and gave us a very nice tour. But you could see the difference in the security. We were the only ones, but they still had like a visitor center that you could go to and fishery.

Lisa Mighetto: But you can't walk anywhere you want.

Glenn Meloy: No. And they used to go to the business of just having sort of a rail or something to keep people out of the areas where they could maybe click a switch or something that would cause something to change. But you don't even get in that section of power anymore.

Lisa Mighetto: But it sounds like you don't remember having any problems with security. I mean, other than personnel being threatened.

Glenn Meloy: In those days, you could have gone forever, I think.

Lisa Mighetto: The days where you could walk right in a hydro project. Yes.

Glenn Meloy: I can remember one time I was going up to Canada on vacation, and my wife wanted to see Chief Joseph as we went by. We were driving, and I just stopped in the office and asked if we could take a tour. No problem. Where do you want to go? But despite the fact I worked for the Corps for umpteen years, you can't really do that anymore. You've got to go through the protocol. So security is different. But, at that time, they let me go wherever I wanted to go, unsupervised.

Probably one of the more significant things is the expanding of the client base. You know, the design standard doesn't just work for the Portland District, or the Walla Walla District. I don't even know what its designations are. It used to be the North Pacific Division when I worked here. I guess it's the Northwest Division or whatever.

There's an awful lot of their work comes out of the Southeast, the projects there. And, of course, they are more rehab-operations oriented things. But a significant portion, maybe even a major

portion of it, comes from back there.

Lisa Mighetto: Is that because they have older projects now?

Glenn Meloy: I don't think they have any older projects than they have out here, it's just they've got more of them. There are an awful lot of small projects here.

Lisa Mighetto: You mentioned there was a center in Mobile that used to handle the East Coast and now it's gone.

Glenn Meloy: Yes.

Lisa Mighetto: Okay.

Glenn Meloy: So I think that's been a major shift in the hydroelectric design center is where the client base is. We've got a lot of different clients we didn't used to have.

Lisa Mighetto: But that wasn't the case when you were here.

Glenn Meloy: Sorry.

Lisa Mighetto: So you went back East – you mentioned you went to Western a couple of times.

Glenn Meloy: I went back to Hartwell because we built that – we didn't build the project, we designed the powerhouse for it. There are five units back there – about 40 megawatt units. So I've been there, been down there, which is different. That was a different agency.

Lisa Mighetto: A different agency? Was that . . . ?

Glenn Meloy: I think that was under Western, wasn't it, Bob? Wasn't Western overseeing the New Melones project? Isn't that part of theirs?

Robert Krahn: Well, no. We didn't have any relations . . .

Glenn Meloy: Just the Bureau?

Robert Krahn: Just deal with the Bureau as far as . . .

Lisa Mighetto: So you do have projects that aren't Corps, or you did work on projects that aren't Corps.

Glenn Meloy: Yes. Not very many, but there were a lot of – I can't even remember the names of all of them that I had been to. I couldn't remember them a year after I had been there, let alone ten years after I had been there. But there were small projects back in the NPD – I'm talking the 20 megawatt category, such as Cougar, or Green Peter or Hills Creek

Lisa Mighetto: It sounds like you must have traveled a lot.

Glenn Meloy: It was . . . And, you know, about the time I retired I was away about 50 percent of the time. Of course, interestingly, one of the reasons I went to work for the Corps, besides the challenge, was I didn't like to travel.

Lisa Mighetto: And you ended up traveling. Did you travel a lot, too, Bob?

Robert Krahn: No, not too well. No. We did some traveling – my wife and I have done that.

Lisa Mighetto: But not when you were working, as a result of your job?

Robert Krahn: No, not for the job. As far as the Corps was concerned . . .

Glenn Meloy: You know, as time changes, and you go having a project that's within a day's driving distance of Portland to one that's on the East Coast, or, you know, you fly to those and you stay overnight. I spent a lot of different times when I went someplace. I'd leave here after work one night and get to where I was going, have a meeting, and come back the next night. Matter of fact, I did that one time going down to Florida.

Lisa Mighetto: And there is a time difference, too.

Glenn Meloy: Which had to do with the Chief Joseph generators.

Lisa Mighetto: How so?

Glenn Meloy: Well, GE had their people there.

Lisa Mighetto: Oh, okay.

Glenn Meloy: Westinghouse – excuse me. They had their people back there, and that's where they wanted to hold the meeting. Then we had a lot of

problems with . . . So those sorts of things would, you know, expand your horizons, so you traveled more.

Lisa Mighetto: Did you end up staying at the project? You mentioned these were small projects.

Glenn Meloy: You never stayed – the only place – did you ever go – you stayed at the project up at Snettisham, didn't you?

Robert Krahn: Yes. Yes.

Glenn Meloy: After you got through chasing the goats around up there.

Robert Krahn: That's about right. That's exactly what we did.

Lisa Mighetto: Now, this is in Southeast Alaska, right?

Glenn Meloy: Just outside of Juneau.

Robert Krahn: That was an interesting project because it was one of the first projects that the Corps had built that's underground. Glenn was right in the middle deciding that's what we're going to do. We're going to get underground.

Glenn Meloy: That was a different kind of project. They do things different up there.

Lisa Mighetto: How so? In Alaska?

Glenn Meloy: Oh yes. Well, they live like there's no tomorrow. For instance, to get to the project, it's about forty miles from Juneau,

and you can either take a boat or you can take a plane.

Lisa Mighetto: But you can't drive?

Glenn Meloy: No. There's no road. I paid for my pilot's license – I don't know if I ever told you. We took a flight from Juneau out there, and they have a gravel strip right alongside the bay, but they generally bring a floatplane in, which was what we were in. But the floats have wheels in them – either or. And the guy that had the airplane, his control panels looked just exactly like mine except he had floats and I don't, and I didn't know much about floats. But I was trying to remember what the position of the gear switch was, but he took off. He was about fifty feet above ground, and I didn't think he had the wheels down. And you're sitting in those floats, you're way up here, and I could just see that thing hitting the gravel on those floats, even though they slide pretty well. I could see that airplane just coming over on its back.

I didn't really know – finally, I just reached over and put my hand on the gear switch and he said, "Oh fudge." But he would have tipped over. He said, "I owe you a beer," which he still owes me. He's never paid off.

Lisa Mighetto: So you have your pilot's license.

Glenn Meloy: I don't fly, but yes, I do.

Lisa Mighetto: Did you fly in Alaska when you were . . .

Glenn Meloy: No, just around here.

Lisa Mighetto: But that's how you got to the project, was in this little plane.

Glenn Meloy: Yes, they had a charter service that the district used to get you there. You went down and they were expecting you, and you climbed aboard and they let you in.

Lisa Mighetto: And this was an underground facility, then. So you designed it here in Portland.

Glenn Meloy: Portland. So, you know, every time you'd go up there, the district office is in Anchorage, so you've got to go to the district office and talk with them, and then come to Juneau, and then come home, and once in a while go back to Juneau and Anchorage.

Lisa Mighetto: Why was it underground?

Glenn Meloy: Cheaper overall.

Lisa Mighetto: Is that because of the environmental conditions up there?

Glenn Meloy: Because of all the ice and snow in the wintertime, and getting to it, and whatever. So they figured it saved a million bucks to do that.

Robert Krahn: Yes. Of course, it was still expensive. It's a different thing in the fact that this was a lake up in the top of the mountain, and we actually built a dam underneath it and brought

it down to the water level . . . reason why that was involved in the underground stuff that we did there, from the only underground project that I was ever aware of the Corps building anywhere.

Glenn Meloy: I don't think they have another one.

Lisa Mighetto: So since then there's not been another one either?

Robert Krahn: I don't know, there must be some others, obviously, in the world.

Glenn Meloy: Oh, there is in the world. I've been to a number of them, but not for the Corps. Actually, when I went over to Bulgaria . . . that was the highest pumping station in the world.

Lisa Mighetto: In Bulgaria.

Glenn Meloy: Yes. It's underground.

Lisa Mighetto: Did Snettisham attract attention among engineers when it was designed?

Glenn Meloy: I don't think any undue attention. I don't remember that.

Lisa Mighetto: So it wasn't considered distinctive because it had the . . .

Robert Krahn: I don't know if it was distinctive or not but it was different, of course, considering it was the first underground one we had ever designed to build.

Lisa Mighetto: Did you go out to the project, too?

Robert Krahn: At times, yes? Yes, everybody had to go out a few times along the way, anyway, to find out what things were being done the way they should be and so forth and so on.

Lisa Mighetto: Did you go on a floatplane?

Robert Krahn: . . . chopper, flying down there, of course.

Glenn Meloy: I never did go on a chopper. Except one time I went in a boat because they couldn't get a plane out there. This was the 23rd of December.

Lisa Mighetto: In Juneau on the 23rd of December? That's hardship duty.

Glenn Meloy: Well, it's interesting because of the difference in the environment, because come Christmastime all of those guys leave the project, and it's like herding cats to get them back. And they were so close to getting the project on line, and GE had some reservations about a couple of things, and so they wanted me to come up. The District Engineer personally called me and I said, "I don't want to come." He said, "Get on the plane."

But, actually, to get up there I made two tries. I spent the night in Seattle twice. My luggage made it, I didn't. And, eventually, on the 23rd, I did make it and talked to them for about an hour and that's all it took, and I was

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ready to come home. So I did get home for Christmas Eve.

Lisa Mighetto: Well, that's a good story. Where do people live who worked on the project? You said it was 40 miles from Juneau. Did they have to go back and forth?

Glenn Meloy: Well, some of them did, – I don't remember how many people that clubhouse served, but it was quite a few.

Robert Krahn: Quite a few. They had to go down at the water level and . . . [inaudible] . . . by the bunkhouse they lived in.

Glenn Meloy: I think they had some construction housing there during the week besides that. The first time I went up there, I can remember getting in late and the snow was clear over the windows like that, and they plowed it out. And, in the clubhouse, you looked through the windows like looking through this, right into snow up to about four feet. And the distinguishing feature of that was about every 10 inches was a bottle of Cold Duck. And you quick-like learned that you don't drink anything out of a water glass that they filled with that, because the minute you drink a little bit, they fill it up again.

Lisa Mighetto: Is that what you meant when you said they live like there is no tomorrow?

Glenn Meloy: You know, they've all got boats, and at that time – I forget what they called them – it was the fish finders and so forth.

Lisa Mighetto: Did they take you fishing?

Glenn Meloy: No, I never did go fishing. One of the guys went fishing for halibut and they were successful. He came back two different times with about 100-200 pounds of halibut. And Alaska Airlines does a good job of packing it and sending it home.

Lisa Mighetto: What was your favorite job?

Glenn Meloy: I really don't know. I suppose Dworshak.

Lisa Mighetto: This is in Idaho?

Glenn Meloy: Yes. Just because it's a little different. At that time, that was one really good-sized unit and a couple of smaller ones, the high head. They had some problems with it that were interesting.

Robert Krahn: How about Libby? Did you spend any time there?

Glenn Meloy: Yes. You know, that project grows on you.

Lisa Mighetto: Libby in Montana?

Glenn Meloy: Yes. It was one of the first – well, I guess probably – maybe we learned our lesson – the only project that the Corps gave an architect carte blanche and we didn't do anything unless he approved. So that project, instead of being square, there isn't a square angle in it. So you have tough time placing equipment in it. When

you want to spend the time to design it so that you have room to get mechanical equipment for cleaning of just simple things on the floor, you would really like to have a power sweeper, where you don't have to go do all that stuff by hand. You can't really do that on the Libby project.

Lisa Mighetto: When was that built?

Glenn Meloy: 1985? 1980? I've been up there a couple of times since. Actually, I was up there a couple of years ago and just drove by it – must be three years ago because I was able to go in. But it has even more flamboyant colors in it than the Bonneville powerhouse does. You know, a real bright blue, dark royal blue on some of the stuff, and the architect had the concept that he wanted the way these beams were put in, he wanted lighting to enhance that, and the shadows and so forth that would enhance them, as to make them appear more massive, and a real headache for a designer.

Lisa Mighetto: In terms of getting equipment in and out?

Glenn Meloy: He had the concept – you know, we have on the top of hydrogenerators they generally have a light up there, but that's part of some other equipment, and his idea was that the shaft went clear up through there, and he wanted to put a light on that, that would circulate, and enhance the shadows even further. And so we spent a lot of time . . . how that would work.

Lisa Mighetto: And all this was for aesthetics?

Glenn Meloy: Oh yes. Lady Byrd Johnson. That was her idea. And so, at any rate, the architect was her idea, and I actually built a little model with a little generator that I could take -

Lisa Mighetto: You built it.

Glenn Meloy: Yes - spin the same - and I put a light on it so it would be spinning at the same speed as that generator. Well, it goes so fast that it would become a single light to your eyes. His idea was, "Don't confuse me with facts; my mind is made up." So we finally built a light up there in order to make it - had to slow it down, which is architectural dishonesty. But he's finally out of there. I notice the project took it out, which rightfully it should have.

Lisa Mighetto: But you thought this was an interesting project, too.

Glenn Meloy: Very unique, no question about that. It was unique; different because of the way that this architect felt things had to be done certain ways that we didn't think were necessarily desirable and so forth.

Lisa Mighetto: Is there anything else in terms of development that we haven't covered?

Glenn Meloy: I don't think so. I think you're going to probably talk to some of the current members. They have a distinct different design

organization today than they did when Bob and I were there.

Lisa Mighetto: You're the first people that I've talked to. Well, do you have any advice on what I should ask them?

Glenn Meloy: Ask them how they're training their new specialists, because in the organizational structure now they don't have it concentrated enough where you have enough of one thing under one person to get that mentor type thing to give people enough work in a specific thing like transformers, or generators, to get and have an actual reputation.

Lisa Mighetto: So people weren't specializing. Is that what ...

Glenn Meloy: Well, I think they are, but I don't think they can maintain it. So I really think that we're going to see a change there because they won't have the expertise. They don't have - you know, Chet Scott was well known in turbines; and they've had some guys since then. Al Hoadly was pretty well known. But they came up through the ranks, where they got enough business in that particular area that you can have a trainee and build them up. I don't think they have that anymore.

Lisa Mighetto: Okay.

Glenn Meloy: I think that's detrimental to the long-range benefit of the organization, personally. But I don't look back at it. I've got other things to do.

Lisa Mighetto: Although they could benefit from your perspective.

Glenn Meloy: Well - they change. It's interesting; the Corps is about 20 years behind in managerial philosophies. I can remember when BPA went through the business of the chief of the administrative engineering did not have to be an engineer, you know, but they had - I can't remember the guy's name, but they went through the business. All you had to do was know how to manage. They went through that and found out that that didn't work, and they went back to an engineering type approach.

Lisa Mighetto: Because they didn't have the technical expertise?

Glenn Meloy: And the Corps 20 years later is about the changing philosophy. I guess it's the Hydroelectric Design Center, if you look at it as being a design center that has to do with power generation. Who is the chief right now? It's the chief of parts and maintenance. His expertise is in the area of environmental - sort of where, you know, environmental people. They don't think that's what the idea of a design center is. It's the maintaining, the channeling - all the expertise and all the work in that area in one particular pot. So those people became very well versed in it.

Lisa Mighetto: So that would be a major shift. Do you have any advice on what I should ask?

Glenn Meloy: I could go on and on. You know, the more I think about it, the more things come up in mind. But if I get to talking about something, you know, there's no end to it because you could just go on and on, and the world continues to exist, you continue to grow and to change, and everything has to go with it.

Lisa Mighetto: What do you think is the biggest challenge facing the Corps in the future?

Robert Krahn: Well, I don't know. It seems to me, of course, obviously if you think in terms of the Corps being in terms of construction, I guess it is a big project and so forth -- you know, all the major types of work that we were involved in have been not completed. So it's interesting, there has been something that Glenn has mentioned, but, over the years, I have certainly seen there's been this change in the design work that we did earlier. We had to have -- in order to get a design -- get equipment designed and constructed and built and so forth. That changed and pretty soon you went to the point then the equipment becomes older, and somewhere along the line, you've got to start keeping them renovated. You've got to keep them up to date. These things don't run forever. Like anything else, a mechanical piece of equipment. So you end up gradually evolving it into more a maintenance sort of an operation rather than a construction design. That's just the way the world operates nowadays.

Glenn Meloy: Oh, just kind of supplementing that, I

remember years ago when we had the brightest young people from the Royal Engineers in England come over and do training over here because they didn't have any work over there to keep up their expertise.

Now, you look at the Corps as being a support organization construction-wise, or the military, and that's what it is with the top two people being military people. You're not going to have that expertise. It isn't going to be there because they're not doing anything. You don't keep it if you don't use it.

Lisa Mighetto: So the English came over here. Will the Corps go somewhere else?

Glenn Meloy: There isn't anyplace else to go unless maybe it's Russia. I don't think they're going to do that, and they're not going to go to China because the chief engineers won't talk to the people over there. We're just not in that mindset. It isn't going to happen, at least not as I see it.

Lisa Mighetto: Well, is there anything either of you would like to add?

Robert Krahn: Oh, I don't know. You could go on and on and think about things, but I think we've reached the point that we've probably touched obviously the important things that really stand out. The world goes on. Sometimes we go with it, and sometimes we don't. We go slowly. It's hard to change. And you can long for the good old days, but they're not coming back so you might as well move on.

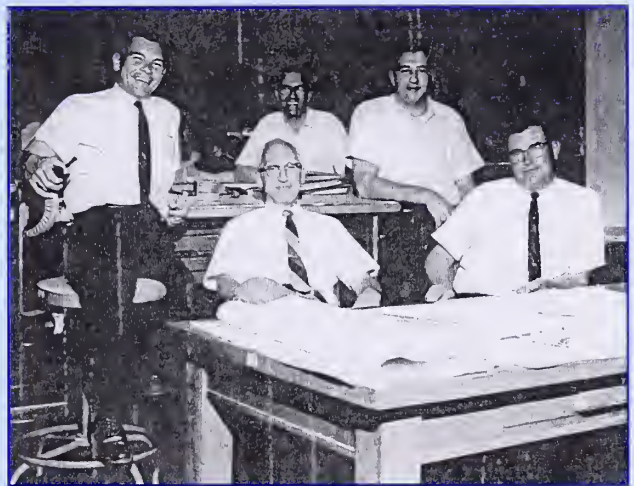
Lisa Mighetto: Well, thank you both very much.



Glenn Meloy in HDC office, (1990s)



Doris Carstensen, Glenn Meloy, Chief of HDC, Doug Seely, Mike Spence, and Lee Cresap



Hydroelectric Design Branch staff. (1950s)



Glenn Meloy working with Doug Seely.



Bob Krhan, center, Chief HEDB, and staff. (1950s)



Hydroelectric Design Branch Reunion, 1998. Bud Ossey, Nick Dodge, Martha Plaster, Bob Krahn, Chet Scott, and Don McDonald.

Glenn Rogers Meloy April 21, 1932 - August 18, 2007



Glenn's career at the Corps of Engineers spanned the use of slide rules to calculators to personal computers. A specialist in hydroelectric design, he was awarded a Management Improvement Certificate in 1974 from President Nixon for innovative design work on the Snettisham Dam in Alaska. In 1986 he was editor of the book *"Innovative Powerhouse Designs"* that is still available through Amazon.com. He spent 16 years as Chief of the Hydroelectric Design Center, North Pacific Division, and led the center to be the "center of competency" in hydroelectric design.

After retiring from the Corps he consulted to the Russian government on replacing electrical power production lost as a result of the Chernobyl accident. He also consulted to the World Bank and to the Republic of Georgia.

Glenn made friends where ever he went; he believed in giving back. He served as Scout Master to local troops and gave back to his profession through his involvement with IEEE. He served as General Chairman of the IEEE's 1995 Summer Power Conference.

In recent years he enjoyed traveling with his wife, Joan, time at the family beach house, coffee at Starbucks, and spending time with his family, especially his granddaughter Caroline Freiling.



HYDRO
ELECTRIC
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INTERVIEW
2

Interviewees: Alan Christensen, Larry Haas, and John Jones

By Lisa Mighetto
November 17, 2004
Portland, Oregon

Lisa Mighetto: This is the HDC interview, November 17, 2004, Portland, Oregon. I suggest that we start out by going around the table and having each of you introduce yourselves briefly. Talk about how you came to work for HDC, how long you've worked here, and what your positions have been.

Larry Haas: Okay, I'll start. I'm Larry Haas. I've been in HDC since 1979, in September. I started pretty much right out of school. I went to Oregon State. I worked one year for Ford Motor Company and then started in HDC, and I started as a mechanical design engineer. I had an offer both from the Portland District Engineering Group and HDC, which was the division at the time, and I decided to go with HDC. I liked it better because it had a larger staff and more expertise in mechanical engineering. It seemed like it was a more engineering group – or a larger engineering group than what the district had at the time. That's what attracted me to HDC, and I've been doing design pretty much in mechanical systems most of that time until maybe the last five years, I've been moved into the coordination role in the HDC Pacific Branch.

Lisa Mighetto: Okay.

John Jones: I'm John Jones. I am now retired for two years. I started with HDC in 1967 when it was called HEDB, and we were in the Federal Reserve Bank Building here in Portland.

I started as a design engineer, and actually that's been my function the whole time. I designed the first successful traveling fish screens on the Snake and Columbia Rivers, and I've done a lot of work since then – modifications to other equipment, I designed a couple of the overhead cranes and gantry cranes that are on the Snake and Columbia Rivers, and the last few years, before I retired, I was involved principally in testing of self-lubricating bearings as regards their use in hydro turbines and various waterways projects, like the locks, the tainter gates, etc. So wherever we might use a bearing, we'd like to get rid of lubrication, or we have a problem with having them lubricated, that's the application for the bearing work that I'm doing.

At present, I'm working on an oil stick-slip testing program to replace the oils that are in the existing turbines throughout the Corps. We're trying to determine which ones give us the best stick-slip properties because if we have a lot of stick-slip within a turbine, it makes it very

difficult to get accurate control on it because the signal will go for the turbine to change a output, and nothing will happen until the pressure builds up. Pressure builds up and it will then jump, usually past where we've asked it to move. And hopefully this is going to eliminate that problem, or minimize it.

Lisa Mighetto: Okay.

Alan Christensen: Al Christensen, mechanical engineer, and I started working here in 1979. I came down from the shipyard in 1997, and worked in the piping section for a while, and then eventually worked in the turbine section, and then when that broke up, worked in Central Branch and later in Atlantic Branch. That is where I currently am.

Lisa Mighetto: Okay, you've all been here since the sixties and seventies, right? What do you see being the major developments that have occurred during your time, the major changes?

Larry Haas: Well, the major change that I see are a couple. One was organizationally. We started out with HEDB. We were a branch. One of the organizations that developed responsible for hydro powerhouse design within the Corps, and becoming the center was a major part in our organization being responsible – the sole source for the Corps of Engineers for design nationally for the Corps. I see that as a major event within our organization.

Lisa Mighetto: And you were here then.

Larry Haas: Yes. And that was in '80 – mid-eighties that was changed. And another one I would say was probably when we made the organizational change to go from being organized by discipline, mechanical and structural electrical branches to regional branches, regional organization, customer focused, I think that was another major organizational change, and this is kind of a big event.

Lisa Mighetto: Did those happen simultaneously, or were they –

Larry Haas: No, they were separate events. The latter one was the one that we changed regionally, about like in the middle nineties. Those are two of the main things I see organizationally. That was your question, right?

Lisa Mighetto: Yes.

John Jones: One of the big things that I've seen change, first off the bat when we were HEDB, when we were in the old Federal Reserve Bank Building and over in the Custom House. The various activities like power, electrical, turbine, mechanical, these were all separate sections, and the fact of the matter is they didn't even really talk to each other. The managers discouraged group-to-group conversations, which made it difficult to get anything done.

After we got over to the Custom House, that changed somewhat, that we had a lot more interaction between the various disciplines – mechanical, electrical, etc. And as we became HDC, that got even more integrated, so each one of the branches – the Atlantic Branch, Central, and Pacific Branch had electrical, mechanicals and structural within each group. It made it a little more difficult for the disciplines to interact with each other.

Lisa Mighetto: They didn't talk to each other?

John Jones: Well, yes, you could – but what I mean is before, when we had the structurals together as a group, had the mechanicals together as a group, electricals together as a group, a piping section that was totally separate, and when we were that way, we generally did not talk to each other. But once we came – well, even before we became a Hydroelectric Design Center, we began to have representatives of each discipline in each one of these branches, so it was easier for them to coordinate, and usually if it was one member of one discipline and one group, and they had a problem, they would still go and talk to the other ones in the other branches. So it was much better from that standpoint.

Alan Christensen: The major things I see are the change from discipline structure to regional, and as Larry talked about, the move from the Customs House to the district, and also the reorganization of them.

Lisa Mighetto: **Why the reassignment to the district from the division?**

Larry Haas: Well, it had to do, I think, with just the way the Corps wanted to be organized overall, where the divisions had oversight in the district's engineering. The districts did the work and the divisions had oversight. And since we were engineering actually doing work, they figured we fit in at the district level, and they were trying to reduce the number of people that actually were in the Division Headquarters building.

Lisa Mighetto: **Was that an easy transition?**

Alan Christensen: It was an easy transition for me.

Larry Haas: Easy for Alan, yes.

John Jones: I think it was not a really easy transition because when we became a Hydroelectric Design Center, we were not assigned to Portland District. We were a separate entity that supposedly provided all the engineering for hydro projects for the Corps nationwide. As a matter of fact, more or less worldwide because we had projects on various islands or whatever, while we were also were involved in that.

When we became assigned to the district, I think this made it a little different because before we became a Hydroelectric Design Center, each of the various districts had their own

engineering groups. Once we became a Hydroelectric Design Center, designated as such, these districts were to have their engineering done by HDC, and there was a lot of resentment because some of the people they were lost by attrition or retirement and stuff like that. But basically, they lost a lot of the autonomy that they had. And there was a lot of resentment, and I think there probably still is.

So back when I started, 1967-75 we were involved in designing various projects on the Snake and Columbia Rivers. That was John Day, and The Dalles, and Lower Monumental, Little Goose, Lower Granite. And we had control over it, and yet at that time we didn't interface from a policy standpoint with the projects, and they resented us, too.

I think it's been better in the last few years that we have a little better interaction with the districts.

Lisa Mighetto: **Well, you're part of the district now, right?**

John Jones: I didn't mean the Portland District. I meant the districts like in the Atlantic Branch, and Central, and Pacific - districts other than ours - the Seattle District, for instance, or Omaha District.

We have a little less resentment there, but it's been a problem, and I think it's because the Hydroelectric Design Center was basically forced on them. They didn't have any say in whether this was going to happen

or not. I don't even know how we came to be a national design center, in all honesty. I know that we had a lot of people here working towards it, and we had probably the most expertise because we were the most recently involved in designing hydro projects, whereas most of the ones on the East Coast and Central U.S. had been in place for some years. And so the actual design work, mostly expertise, was out here, and that's how we became the Hydroelectric Design Center for the Corps.

Lisa Mighetto: **How do you account for the decreasing tension with the districts like Omaha? You mentioned that it had decreased, right?**

John Jones: Yes. Well, I don't know about Omaha particularly. I was just naming that as a district.

Lisa Mighetto: **But outside the Northwest.**

John Jones: Outside the Northwest. Even the Northwest here, because Walla Walla is a separate district, and there was resentment there of HDC.

Lisa Mighetto: **But it's better now.**

John Jones: It appears to me that it is. I think we had a better relationship with all the districts by the time I left here, which was two years ago, than we had had in prior years. There really had not been, and I think there had not been enough communication between us and

the other districts, or the projects. And I think that has improved. Part of that is because the HDC personnel were allowed, as a matter of fact even required to go out to the projects to see what's really going on, to interact with the people out there.

So the better communication, I think, is what's really helped. Previously, we didn't have much communication, and you know yourself if somebody came in that suddenly said well, now we're going to do your work, or we're going to show you how to do your work, you would resent it. And that's kind of what these various districts and projects and so on, how they felt with us.

Lisa Mighetto: Is part of it them just getting used to the idea?

John Jones: Part of that, but I think the management attitude here has changed enough that instead of saying we have our little fiefdom here, that because – you're the customer, we want to know what you want. We want to try to provide you with what you want. And as a matter of fact, in recent years – I don't know really just how long, perhaps ever since we became a hydro design center, they actually paid us. And so what we'd have to do is – and it's more so now, you have to compete for their work. In other words, we'd have to look and see what they want, and make an estimate of what it's going to cost and so on, and provide it with product, because they were no longer required -- I think this is still true, is it not,

Larry – that they're not required to use HDC.

Lisa Mighetto: Whom would they use?

Larry Haas: We still have our –

John Jones: They could use a private firm.

Larry Haas: We still have our mandatory design center of expertise that for the certain parts in the powerhouse they're required to come to HDC. As we maintain that expertise for the turbine generator power train parts of the powerhouse, we need to make modifications or change out equipment, they're still required to come to us so we maintain an expertise.

But I think a lot of the reason, too, why there's that resentment is the way jobs are paid for is through corporations. They use their congressmen and their senators to go to Congress to get money to build, or to work on these projects, and they do it for the people in their region. They don't do it for the people out in the Northwest, so we can have jobs here.

So I think there is some resentment there. Their congressmen, their senators are getting money for work for their particular geographical area. I think they'd like to see that work done in their area, not out here.

John Jones: Even their engineering had no control of it. That's what's done here. The

actual work would obviously still be done there by local contractors. By the way, this is John Jones.

I think that Larry's got a good point there. They've resented the fact that they had an engineering group that was gradually dissolved, each of these districts, and they were being forced to utilize the services of HDC, and they had local contractors, a lot of them good ol' boy type networks, and they wanted the money to stay locally, and they resented having to have it come here.

Larry Haas: And we've tried to, in the recent years, to really stress that yes, on paper we're the mandatory design center, but we try to make the "m" in mandatory a small m. So it's not a place that from this place that they'd have to come to us, but it's a place they'd want to come to. So we want to really stress that. You know, they're happy with the work we do, they're pleased. In fact, they desire to come to us, and try to really make that "m" a small "m," rather than a capital "M," because if you make it so that they have to come to us when they don't want to, then it's not a good situation to be in.

Lisa Mighetto: I didn't mean to ignore you.

John Jones: Do you have anything to add to that? Jump in there, Alan.

Alan Christensen: I was going to say that when we talked about engineering, there really were three HDC design branches – the

one in Omaha, and the one in Mobile, and those are the ones that got closed down, and they combined them into the Portland HDC.

Lisa Mighetto: What percentage of HDC's work – you've got these three branches. Is most of the work still done in the Pacific branch?

Larry Haas: When we originally broke up in the what, eighties, nineties – what did we say it was, mid-nineties – we broke up into three branches: Atlantic, Central, and Pacific. And at that time they were pretty evenly distributed as far as work, fairly evenly distributed. But since that time, currently Pacific has got – over half of the work for HDC is from Pacific branch. In fact, this last year the work that the Pacific branch had, we could have funded all of HDC if we wanted to. Instead of using these, we could have just done all the work in-house, and we could have employed everybody full time just doing Pacific work.

Part of that is because of the funding now. Now we're direct funded. We no longer depend on appropriated funds from Congress. We are direct funded by Bonneville Power Administration, so that's really added funding to our work in the Pacific Region.

Lisa Mighetto: As opposed to, say, the Missouri River Basin.

Larry Haas: Correct.

Lisa Mighetto: So it's not that you have more projects and larger projects out here, or is it?

John Jones: We have larger projects. We have larger projects here. But far and away there are more numerically. There are more projects in Atlantic Branch and in Central Branch. You know, they've – like we don't do anything except occasionally advise, like for TVA. And we advise also for some of the private power back there. But we've got just many, many more dams of all sizes back there, and most of them are older, and so initially when we had the three branches, there was a lot of work in the advisory sense, or design side, for these people from HDC.

Lisa Mighetto: On the older projects.

John Jones: Older projects. Now, many of those have been completed, or at least gotten far enough along to where – and they don't have any more funds to do any more upgrading at this time.

Lisa Mighetto: So back to the funding, what kind of work – like rehab work?

John Jones: Rehab principally, yes, because there were very few places where any new units or a new type of units were being put in. They rehabbed, they would perhaps upgrade both the turbine, and it would be a new turbine, new design, and either rebuild the generators or sometimes upgrade them. And they would try to

maximize the efficiency and the power output from each of the projects, and because we still had expertise that could do that, they weren't quite as resentful about having us do it as, say, for Mobile District or Omaha District.

Lisa Mighetto: And is that the nature of most of the work in the Pacific Branch as well now, rehab?

John Jones: Yes.

Alan Christensen: I was going to say, a lot of the work that we have in the Northwest is also fish related, that other parts of the country don't have to deal with minimum gap runners in the turbines.

Lisa Mighetto: John, you mentioned you – didn't you say you helped design, or designed a traveling screen?

John Jones: Yes, I designed the first successful traveling fish screens.

Lisa Mighetto: Was that in the seventies?

John Jones: Yes, mid-seventies actually '75 or '76. I think '76 was when we delivered the first traveling screen up to Lower Granite Dam, in eastern Washington.

Lisa Mighetto: Had anything like that been done before?

John Jones: There had been work done by the National Marine Fishery Service, and the Corps had been involved in some

of that because it was a Corps project that was going in, and just that the designs were complex and prone to failure, and so it required a complete redesign and self-extending screens in place there and so on.

So it was a design that we got away from the steel mesh on screens, which the original ones had, the National Fishery Service had, and we put in a Dacron netting so it had about one-eighth-inch square holes in it, the mesh on the screen. So it traveled, and it was like a conveyor belt, and the only reason for using those, we have perforated plates to reduce the flow through the screens. It would be inside this escalator, if you will, okay, and it has perforated plates that are sized such that we have very little pressure drop where the screen face is, and most of the pressure drop would occur inside the framework where these perforated plates are. That allows the fish to impinge, but still be able to get off of that screen, while the screen travels and dumps the trash off the back. So we keep a clean screen. Otherwise, it would just plug up.

The old ones, because they were metal and they didn't really have perforated plates in there, there was a lot of fish killed, and we really didn't know how to guide these fish. We know a lot better now because many of the people who have been working with this have had cameras installed and so they can watch and see what the behavior of the fish.

Lisa Mighetto: So this was new at the time you were doing it. The design was innovative.

John Jones: Yes.

Lisa Mighetto: Did you work with biologists?

John Jones: Yes, always.

Alan Christensen: They were your friends.

John Jones: No, they weren't our friends to begin with, but once they found out I was really on their side, why, we were friends.

Lisa Mighetto: Why weren't they your friends to begin with?

John Jones: Well, because they thought we didn't listen to them, and in some ways we didn't because the things they were asking to have done, mechanically, it was either too difficult, or impossible, and always expensive, nothing but an idea in their heads. They knew what they would like to do with the fish. They would like to get 100 percent of the fish passed, no damage, and no injuries.

Lisa Mighetto: They just want to save the fish.

John Jones: They wanted to save the fish, and they didn't seem to realize that no matter what you had there, because of the loss to the water head and so on, if they impinged on any device in there, some of them are going to get de-scaled, and some of them will get injured severely

enough to where they'll die from it. Eventually, they learned that many of the deaths from going through the turbines were just that, from going through the turbines. They'd have a sudden decrease in pressure after they moved through the turbine, past the turbine blades. Their air bladders would just suddenly expand, and it would either shock them, some of them got killed, but most of them that got shocked like that died from predation right downstream of the dams, the various fish, kestrels and seagulls and lord knows what.

Lisa Mighetto: Waiting to pluck them.

John Jones: Yes and the squawfish. They were waiting for the downstream migrating fry, and if they came through injured where they were easy prey, why, they were gone.

Lisa Mighetto: But later the relationship with the biologists improved?

John Jones: Yes.

Lisa Mighetto: Were these National Marine Fishery Service biologists, Corps biologists, or both?

John Jones: They were both, but mostly NMFS when I got started in the project, and they just – it was one of these things where there wasn't a lot of communication because there was still an attitude here at HDC, I think, that "we know how mechanical things and so on are supposed to operate, you people

don't. And so they didn't have as much input as far as what we might try, as they did later on.

Lisa Mighetto: Do you still work on fish facilities? You mentioned the minimum gap runner.

Alan Christensen: I personally don't because I'm more involved in programs.

Lisa Mighetto: So you would generally at HDC be concerned with anything related to the production of power directly, not a bypass system or transportation system.

John Jones: We were involved in that.

Lisa Mighetto: Oh, you were?

John Jones: Sure. Once – well, that was more or less, I would say, guided by the biologists because it said okay, can we try this, and get these downstream migrants into a channel where we can bypass the dam, instead of running them through the turbine, or over the spillway, or whatever like that.

Lisa Mighetto: And HDC was involved in that.

Alan Christensen: Because one of the chutes went through the center of the dam. It was mined out the full length of the powerhouse.

Lisa Mighetto: And that was Alan, and I interrupted you. You were talking –

Alan Christensen: No, that's fine.

John Jones: What Alan was talking about is called an ice and trash sluice. It's in next to the forebay, which is the lake behind the dam, and we would let the trash in there, there's stop-logs out front, and you could put those down or whatever and let that trash run into the ice and trash sluiceway, and it would go on the full length of the dam and bypass the dam, and they wanted to try to utilize that to have the fish bypass. And so they had various means that they tried to guide them up so that they would get in the top couple of feet of water and go into the ice and trash sluiceway, and bypass the dam that way.

But they've still got a 90-foot drop or something at the end of the sluiceway you know.

Alan Christensen: Actually, I think in one bay they actually had a separate channel running through the center and then they had a chute that went around.

John Jones: I think that's right. But we had a lot to do with the design of the fish-counting facilities and so on. In other words, whatever means we were trying to get the fish past the dam and collect them. We did the design work for these things because it affected the operation of the dam, and the NMFS people, they were not in the design business.

They were biologists principally, and so we actually

designed and built the various facilities, whether it was bypass or collection directly, and even these traveling fish screens. They brought the fish up into a channel just like that and bypassed the dam, and we may intercept them. We did in many cases intersect the channel as intercepts and run it down through the fish-counting stations, where they'd mark them. I don't know what percentage, but a fairly large percentage of the downstream migrants. They would actually implant a small magnetic like a needle in them, and then release them, and that let us have information about returns, whether they go all the way back to where they came from, back to where they were marked or not because some of these stations were clear upstream like Lower Granite dam, which is clear up by Lewiston-Clarkston, Idaho.

Lisa Mighetto: But you have no biologist on your staff, right?

John Jones: No.

Lisa Mighetto: Was this work distinctive into the Pacific Coast Branch?

Larry Haas: Really, that was work the district was doing, and I think our role – it was more a consulting role, because our primary function is pretty much the power train, and what effects the power – producing the power, fish greens hang on the front in the powerhouse, so that obviously was – we decided was – and hangs in the front end of the turbine, so it definitely

was within our realm of power production.

Some of the bypass systems were really the district's responsibility, but we provided input, and we were part of the team in that process. But really the design function was like the bypasses and some of the other systems, the routing around, and it was really done by the district. The tagging of the fish was done by the biologist. We were part of the teams, but were not directly doing the work, I guess.

Alan Christensen: That chute actually went through the middle of the powerhouse. We were involved directly because of the structural integrity, I guess.

Lisa Mighetto: Was there any interest in this kind of work, fisheries bypass or fish passagework, outside the Northwest?

Alan Christensen: I don't think so. Not that I know of.

Lisa Mighetto: So it's unique to salmon and -

John Jones: Well, it developed . . . the traveling fish screens and various bypass procedures have been used by the PUDs on the Columbia River upstream here. They're not Corps dams, they're public utility districts. They've been used on several dams back east, and those people have come out and asked for plans and so on for what we were doing because it was just a matter of time before they were

required to try to save the various fish in their areas.

Lisa Mighetto: Which projects back east?

John Jones: I can't name them for you. I don't know. I don't recall.

Lisa Mighetto: But they actually came out here.

John Jones: Yes. And because we wanted to give them every advantage that we could, in light of sharing our expertise with them, because if it's not a Corps dam, we don't really have any money to do anything for them anyway unless they get a contract with us.

But as far as sharing what we've done and so on, we've always done that. And what they've done since then is really up to them. But like the public utility districts on the Columbia, there's one dam at Wenatchee and a couple of more downstream from there.

But, at any rate, they've put in various screens, and I had left the Corps for about ten years, and during that time, I did some design work for one of the local companies here. They had a contract with one of those PUDs, and so we tried different types of systems to screen the fish out and get them up into the bypass of the ice and trash sluiceway.

Lisa Mighetto: But you weren't with HDC at that time.

John Jones: I was not with HDC at that time.

Lisa Mighetto: But it sounds like HDC was consulted for other fish passage.

John Jones: Oh, yes. Sure. That was before - as a matter of fact, after I came back to work here - I came back to the Corps in '89 and from then on I've been barely involved in all the fish work. They had done a lot of design work while I was gone, as far as having bar screens instead of traveling screens.

Lisa Mighetto: What kind of screens?

John Jones: They're called bar screens. It's a - you've seen the grates like in front of department stores or something that warm air comes up through? It's that type of material, but only water goes through it and theoretically guides the fish up and they have a sweep that sweeps the trash up over the top. And because it has so many fewer moving parts, those screens last a lot longer. But they also have a lot more loss to the turbines because just of themselves, the bar screens have a lot of pressure drop as the water goes through the screen. And so the fish are a lot more likely to stay on there.

You have to have these perforated plates that are inside the screen frame. You have to have them more narrowly closed off so that most of the pressure drop occurs at the screen - I mean at the plates. Otherwise, the fish are sucked on in. It's like

opening up a vacuum cleaner. If you have the pressure drop back here because it's more open up where the fish are, they can get off of it. And that was the advantage to the traveling screens, because they were very open. They were about, oh, 65-70 percent open. And the bar screens are something like less than 50 percent open, just by their very nature. So there was a lot of loss there.

But they had to increase the size of them to even get the same amount of retrieval of the downstream migrants. But they now work better than the traveling screens did.

Lisa Mighetto: Are there other technological developments that are significant to HDC? We've been talking a lot about fish, and that's interesting.

John Jones: Since about 1994 – maybe 1993, I've worked on the testing and eventually then the application of self-lubricating bearings to our projects, both as far as used on these traveling screens, but principally was designing for the bearings to go into the turbines.

As I mentioned before, we have a lot of problem because a bronze bearing, coupled with the motion of our turbines – I mean, these blades move very slowly and they may sit still for anywhere from a few seconds to maybe 10 minutes or so, or if the unit is shut down, they may set for days. And when you try to move it, because the pressure

never goes off the blades – in other words, just the weight of them, because a blade weighs what, about 7 tons or something like that, and so it's hanging there suspended with two bearings, and the load on the bearing never goes to zero. Just the gravity puts that 7 tons on there, and when we have the turbine operating so that the water load is on there also, it goes up much more than that. Thousands of pounds per square inch in there. And so no oil that you have in the turbine can really lubricate very well because it doesn't really stay in between the interface.

Okay, because of this high stick-slip and so on like that, we were looking at self-lubricating bearings, which the bearing itself is the lubricant. And so you don't have anywhere near the stick-slip or the very high initial friction on these – when a system that has that type of bearing in it tries to move. It's much easier to move, and there is much less difference between the effort to make it begin to move and the effort required to keep it moving.

So what it amounts to is if we can get rid of the oil in the turbines, we don't have the oil spills, so we don't have the ecological damage from the oil, and we have a longer lasting turbine mechanism because it doesn't have all the strains that come into it from the stick-slip activity.

And so we've got that fairly well along. I've had published a report which not only shows the results of all this testing and how the tests were developed, but to

rate the bearings for various uses because they're not all the same. One bearing would work out best in a dry application, and the other one would work best when it's wet and so on. And so –

Lisa Mighetto: When you publish this, is this for the Corps or –

John Jones: It's for the Corps and it's – well, it's for engineering in general, but the actual publication was by CERL, the Construction Engineering Research Lab. And it's available on their website. Now, the problem is that they've done nothing to disseminate it. In other words, the information is there, but unless we get it out to the field, why, nothing happens with it.

I've had a lot of interface with the projects throughout the U.S. and including Canada regarding this, and they by and large are using the results of our tests, if they're going to use a self-lubricating bearing at all. There have been some bad results from using self-lube bearings, and that was really prior to us doing any testing.

That's how we got into the testing in the first place, because the advertised properties and the real world properties, the materials, were very different. And so I devised a testing program where we could test every one of them exactly the same way, and so we'd rate them exactly the same way. They'd have the same load, the same motions, the same da-da-da-da-

da. And so then we could rate them by their performance, and that's what that report is.

The only thing I can see that really needs to be done is that information needs to be more widely disseminated, to make at least the hydro industry know that the information is available and where.

Alan Christensen: I just want to mention that where we did install the greaseless bearings were in the wicket gate, and operating linkage.

Lisa Mighetto: In the wicket gate?

Alan Christensen: Yes. That's where they actually are being installed right now, at least on two leading projects; Bonneville and Dardanelle.

John Jones: Right. Well, there have been other projects. As a matter of fact, what's our – this is John again – Chief Joseph, I think it is – Chief Joseph Dam up in Washington, that's a Corps dam, and they just got through taking out some of the bearings that rated the best in our tests. They had been in service for 10 years, and they still look perfect, whereas the original greased bronze that they had in there before, they would be in pretty bad shape by that time.

And so we do have some notable successes, as I started to say, that most of the places where they were failures were caused by I'd say misapplication of them because the people

selling the bearings didn't really understand what the limitations to them might be. And so our projects would say hey, great, and they would then install these someplace, and because it was a misapplication, the bearings would fail early. And that really made an uphill battle, and it's still going on, to try to get people to convert to a self-lube bearing because it's – it's just you have to have any bearing applied properly for it to last well, and that's what this research hopefully has done. It's allowed them to apply it more nearly properly.

Lisa Mighetto: Are there other technological developments?

Alan Christensen: I might talk about minimum gap runners. I didn't really get involved that much with the minimum gap runners. I was in another branch but essentially was to prevent fish damage as they went through the turbine to make the gap where the blade fits up against . . . as small as possible.

Lisa Mighetto: And this is a very recent development, right?

Alan Christensen: That was – yes, the first ones were installed at Bonneville.

Lisa Mighetto: And when was that?

Alan Christensen: Well, they were started four or five years ago, and they haven't been finished yet. There are ten units there, so they're still ongoing –

John Jones: Progressively installing them all. The same thing with the self-lube bearings, at the same time.

Lisa Mighetto: So is it too soon to know the success rate?

Alan Christensen: Well, they've done some tests and they claim that it wasn't directly involved with . . .

John Jones: Alan, can you give a little description of what this minimum gap runner amounts to, where is it? I know you said next to the turbine hub. A little description of where and how –

Alan Christensen: It's hard to explain without a visual.

Lisa Mighetto: How does it keep fish from being injured?

Alan Christensen: Okay, as you've got your hub and you've got your blade stick out, and as this blade rotates, there's a certain point where the gap increases, and the minimum gap blade design allows a small gap because it's hub is spherical as it rotates it keeps the gap small and all thru the blade travel. Without a visual it's hard to really see what's going on.

John Jones: The problem is that where this gap is, you'd have that sudden pressure change. If these migrants were over near the gap, there was a lot more of a pressure drop as you went past, as opposed to if they just went past the blade itself. And so they would be injured

there from the sudden pressure change. It wasn't that they were getting smashed up or anything, but they were getting the sudden pressure shock, and there was a fairly high mortality rate from that, and it took a long time to find that out.

Alan Christensen: You had to have cameras right down there watching the turbine, and the water is not all that clear on some of these projects. And so what it amounted to is first somebody had to decide where they were being injured, what part of the system was injuring them, and that turned out to be one, and the development of the minimum gap runners, Alan was saying what it did is allowed us to instead of having it lathed, it was curved where it fit the turbine hub, and if you rotate it, the gap gets bigger.

Now, there is only one place where you could have it where it fit well. Okay, if I go into this spherical surface on the hub, now as it rotates that gap stays the same. And they've also got cutouts on some of these hubs so that the tips of the blades can go in the cutouts, and it keeps the gap from increasing as the blade angle changes. And so we don't have so many fish getting so much of a pressure drop and becoming subject to the predators downstream, and/or being killed outright as they go through there.

Lisa Mighetto: And who was responsible for the design? You said their names, right?

Alan Christensen: Well, there were some engineers in HDC that also worked with Voith. I was also going to mention the benefits, I think of the minimum gap was it also improved the turbine efficiency.

Lisa Mighetto: Which is a nice plus, right?

Alan Christensen: Yes, a nice plus.

John Jones: It's small, but they would always want to include that. They would always want to include any efficiency change in the evaluation of a change for some other reason, because if you have even just a fraction of the percentage change in efficiency on the unit, it means thousands of dollars a year on each unit's increase in output from the unit. And so, of course, if that ever happened, they would want to include it.

Lisa Mighetto: So it's nice that this can benefit fish, and be more efficient.

Alan Christensen: Right.

Lisa Mighetto: How about, are there other developments that we haven't talked about that affected HDC during your time there?

Alan Christensen: We're talking about technical developments.

Lisa Mighetto: Yes, maybe we should finish technical, if there is anything else there.

They would always want to include any efficiency change in the evaluation, because if you have even just a fraction of the percentage change in efficiency on the unit, it means thousands of dollars a year on each unit's increase in output from the unit.

Lisa Mighetto: Well, actually, others have talked about that, so we can move into other kinds of developments.

Larry Haas: Well, I was thinking the big plus has been the funding part, and the way that – the Northwest has a motto. It is funded now by the BPA and not only is the funding stream different – I mean, the reason for doing work now is not based on politics back in Washington, D.C., which depends on what the budget deficit is and what the priorities are as a nation. It doesn't depend on that at all. It doesn't take years to decide that, whether or not to do a project, whereas it's decided upon the region that's got the revenue, that's collecting revenue from the energy that's being generated, and it's based more on what makes sense, what's economics, what are the economics of fixing something or not fixing something, rather than what are the politics of the nation.

And so what that has done has funded projects that make sense. It doesn't make economic sense based on revenue and payback periods, and it's made the funding a lot quicker. We can get projects funded sometimes as quick as just a few months, a relatively short amount of time to get funding to do something that needs to be done.

If something breaks, we have a way of getting it fixed, getting funding to fix it within just a short amount of time, whereas the old route, everybody outside of the Northwest has to go to Congress, has to get appropriate

funds, which takes a lot of time. It takes a lot of politics and a lot of time to do that.

John Jones: We did, too. We used to be that way.

Larry Haas: But in the Northwest it's all – and we used to be that way, too. But it's changed, so now it's all regional, and it's not so much district, it's – we have three districts in the Northwest, and we pretty much operate as a team. We're part of a team that works with a BPA. They don't even consider themselves a client or a customer or a money person. They consider themselves a team member. They're just a team member, and the Corps is part of that team, and we decide together what makes sense to do in the region as far as economically.

Lisa Mighetto: And when did that development occur?

Larry Haas: That was about the same time – relatively close to the time we broke up into regional teams.

John Jones: I think it's been more recent than that because it wasn't long before I retired, which was in 2002.

Larry Haas: Maybe around 2000.

Lisa Mighetto: That's very recent. But it sounds like you think it's very positive.

Larry Haas: Very positive, and that's not only is it – it makes more sense to let the revenue decide whether it makes sense,

you know. You're basing the work on economics, whether it economically makes sense to change out the equipment, and you have decisions by the people who have the money, but it also has generated a huge amount of work for us, like last year we could have funded our whole office with just the Pacific Region's revenue – money we had, because it makes sense to make the units more efficient. Just a small increase in efficiency generates a huge amount of revenue, and the BPA is willing to pay for that because it makes sense.

But it doesn't when you look at the politics back in Washington when there's all these demands on budget deficit, where to spend the money. Power production does not rate very high.

John Jones: Incidentally, along with what Larry was saying, because most of the work is generated here in the Northwest, and because the politics controlling the Central Branch and Atlantic Branch work – I mean funding through Congress and so on, the Atlantic Branch and the Central Branch here have been working with the Pacific Branch people to do the work here in the Pacific for this past year, which makes it nice.

Lisa Mighetto: Do they stay in their regions and then just work remotely with you?

John Jones: No, no. I was talking about the people right here at HDC – Atlantic, Pacific, Central.

Lisa Mighetto: Okay.

John Jones: These people here at HDC have physically been doing the work for the Pacific Branch. In other words, as though it was all a large single Pacific Branch mostly.

Alan Christensen: Just like it was before.

John Jones: Right. Well, except there's better coordination and all that. But that's a good move. It would be nice if each one of the branches – if their area was funded the same way so that they didn't have to go through Congress all the time, because they can elect to not do a project. I mean, the districts out there, the projects, they can elect to not do anything. But if they need something, like here in the Pacific Northwest area, because of the agreement with BPA, we can get funds to go ahead and do that work right now when it needs to be done, when it's the most economical to do it. And otherwise through Congress, if we had a unit that went down and there was no money available to fix it, that thing might sit there for several years. Some of the East Coast projects have been down for three or four or five years.

Lisa Mighetto: So you're saying BPA can fund that?

John Jones: Yes. If it's in the Northwest. And if like Tennessee Valley Authority, which, of course, it's separate from the Corps, and I don't know how they fund things, but I know that they have certain problems with funding, the same as we

have. And I would say if each one of these areas operated in the same fashion as BPA and the Pacific Northwest work together, it would be a lot better because it would be direct. It would be a direct connection between the money and the project that needs it.

Lisa Mighetto: Okay. Have they expressed interest in that?

John Jones: I don't personally know.

Larry Haas: They've been working on that with Congress to make it – to allow them to fund it. It takes [like a Congress] to make them so they can physically do it, and there has been some interest – they're moving in that direction, I think, slowly.

John Jones: I think that probably there wouldn't be as much interest as out here because those senators are after getting money for their own states. And right now they have control of that money because it has to go through Congress.

Larry Haas: It works real well out here in the Northwest because it's one identity. BPA controls all – they distribute all the power for the Northwest and they collect all the revenue, so it works really well for the Northwest, whereas other parts of the country, there is no large – one large agency that both distributes the power and collects the revenue. So it's – it's a little more complicated for the rest of the country to do that.

Lisa Mighetto: How about – I'm thinking in terms of developments. The group that was in here before, as they were going out, was talking about reorganizations – various reorganizations that the Corps has undergone in the last, oh, gosh, fifteen years or so. Has that affected HDC?

John Jones: You're talking about Corps-wide?

Lisa Mighetto: Yes. Right.

John Jones: Reorganizations?

Larry Haas: Maybe we do some divisions. I don't know, I don't see that as a large impact.

John Jones: It hasn't been that much impact here as far as I know of.

Larry Haas: I mean, but there are other changes – a lot of changes, you know, just technological about we use more computers; the controls in our powerhouse are a lot different. They make things a lot more digital, governors, a lot more electronics in the powerhouse now than there used to be.

Lisa Mighetto: When did remote operated powerhouses come in?

Alan Christensen: As the powerhouses become operated by digital governors, they can be remotely operated from different parts of the country. I think the one in Sault Ste. Marie is being operated out of Nashville, and Sault Ste. Marie is in Michigan.

Lisa Mighetto: Is that a Corps project?

Alan Christensen: Yes.

John Jones: The Corps has been involved in a lot more than just hydro projects. Was it Chicago that we were making the big drain system and so on right there?

Alan Christensen: At McCook.

John Jones: Okay, but that is at Chicago, right?

Alan Christensen: Yes.

John Jones: And it's a huge, huge project that's to provide drainage and temporary storage for rain runoff and so on for Chicago and the surrounding area. And I think part of that is about 100 feet, or maybe more than that, underground.

Alan Christensen: It's actually 300 feet.

John Jones: Three hundred feet, okay. Huge thing. It's like having several freeways underground.

Alan Christensen: It has a 33-foot diameter tunnel – drainage tunnel.

Lisa Mighetto: That's not HDC.

John Jones: HDC was helping with the design of that.

Lisa Mighetto: Oh, they were. Okay.

Alan Christensen: It's not hydro, but it was farmed out for the Chicago District.

John Jones: That's what I was saying. What I was saying is that HDC is not just involved with hydro projects. But if we have the expertise for some of these things, the various districts like Chicago District farmed this particular project out to us, and apparently they were asked to do it by the municipal government.

Lisa Mighetto: It's not completed yet, right?

John Jones: I don't think so.

Alan Christensen: Well, it was done in stages. The first stage was done like fifteen years ago, where they had like – they were designed for eight pumps and they installed six of them, and then the Corps was involved to install the last two pumps.

John Jones: This also involved some rock quarries that are unused, and they're using them for temporary storage and so on like that. They run the water into there, and so they can then pump it out at a more controlled rate. So they can go ahead and let the water drain without flooding places if it has a place to go, and then they dispose of it after the rain stops.

Lisa Mighetto: Are there other examples of non-hydro projects?

Alan Christensen: Well . . . Florida, in which I was involved for a period.

Lisa Mighetto: In the Everglades?

Alan Christensen: That's right, the restoration of the Everglades. We've got a lot of work that's been done there over the last about seven or eight years. We're impounding areas so that they can use natural filtration, and they've closed off a lot of the canals that were used to drain the Everglades and the surrounding swampland. They're closing them and/or diverting them, so they're pumping the water out into these settling ponds and they're using natural vegetation to filter out the phosphates and so on like that. And water is then being allowed to seep back into the ground. In other words, it's going to take about as long to restore the Everglades as it took to drain them – maybe more. But that's the intent, and the Corps has been involved deeply with that.

Lisa Mighetto: HDC has, too.

Alan Christensen: Yes.

Lisa Mighetto: Would that be the Atlantic Branch then?

Alan Christensen: Yes.

Lisa Mighetto: I wonder why – I don't have any interviews with Atlantic Branch people.

Alan Christensen: If Al Lewey was here you would.

Lisa Mighetto: Oh, okay. So he could have given us the –

Alan Christensen: And I'm from the Atlantic Branch.

Lisa Mighetto: Oh, you are. Okay.

Alan Christensen: But I just transferred from Central to Atlantic two years ago.

Lisa Mighetto: So did you work on the Everglades?

Alan Christensen: No.

Lisa Mighetto: That's a huge project, that restoration. Billions of dollars, I think.

Alan Christensen: Yes, several billions. But they already can see some differences in it. It's starting to reverse, but it's going to take a long time because they spent a lot of years – 50 years at least – draining that area.

Lisa Mighetto: And you think it will take that long to restore it.

Alan Christensen: Yes. I don't think it will ever be totally restored, but it will be a lot better than it is now.

Lisa Mighetto: We were talking about technological developments and you mentioned remote controls, [hug-downs]. Is security an issue?

John Jones: Security is an issue. I know that we have projects – maybe all of them now

– that have remote cameras and so on, so that the operator can see over the entire project from the control room.

A lot has been done since 9/11, too. A lot of priority has been put on security. But none of that work has been done by the district. It's mostly been – maybe we've been a little bit of a team member, but very little because it really doesn't involve the power production. But it has been a lot of effort put into security.

Lisa Mighetto: Okay, but it doesn't involve HDC to a great extent.

John Jones: Yes.

Lisa Mighetto: Okay, well, how about – I mean, you mentioned flex time. How about social developments, or developing in the work culture? You've all been here since the sixties and seventies, so you must have seen lots of changes.

John Jones: I recall that if you went to lunch and you were a few minutes late, even if you were going to make it up in the evening, you would have to sign up for annual leave for a quarter of an hour or something like that, and this was ridiculous because you had to do the same thing – you either took sick leave or annual leave, if you had to go to the dentist, or it didn't matter what it was.

Lisa Mighetto: So you didn't have sick leave, then.

... most of us worked considerably more than the forty hours. We were getting paid for the forty hours, and it was all right for you to work fifty hours, as long as you weren't getting paid for it, but if you were going to be gone five minutes of the forty hours you were supposed to be there, you would have to take leave for it.

I remember flex time being where you decided core hours are between 9 and 3, and you could choose your start time, and your end time was determined by 8 hours. But anytime between 6:30 and 9:00 you could decide when you wanted your start time to be and that would be your normal schedule, and that worked well.

John Jones: We had sick leave, but you had to use sick leave to be gone, even if it was just going to be a few minutes, and even if you were going to make it up. And most of us worked considerably more than the forty hours during that time. We were getting paid for the 40 hours, and it was all right for you to work fifty hours, as long as you weren't getting paid for it, but if you were going to be gone five minutes of the forty hours you were supposed to be there, you would have to take leave for it. So it's much better now. We do have flextime, which oftentimes allows you to – well, for instance, with the flextime we're supposed to have a standard number of hours we're here. We can start sometime in between here, be here this number of hours, and our ending day can be anytime within the rest of this. Normally you would have to get approval from your supervisor and so on, but this allows you to arrange, even on a particular day, you can tell your supervisor okay, I'm going to be in a couple of hours late tomorrow because I've got a doctor's appointment, or whatever, and so you do. You don't worry about leave, because your flextime, you just work those two hours – presto. Far easier, and the employees feel more like adults than kindergarten children that have to be led by the hand and told every mouthful to chew and whatever like that.

Lisa Mighetto: When did flextime appear?

John Jones: I don't think we really had flextime until we

came over here, did we? Didn't we have flextime in the eighties? It must have started during the time I was gone.

Alan Christensen: Yes, you were gone – you didn't put that in there but you were gone for a good chunk in the middle.

John Jones: About ten years. I left in the fall of 1979. I went back to work for the Corps in November 1989.

Lisa Mighetto: And there was flextime when you came back.

John Jones: Yes, and because there was no place to go where I had come back to work, which was up at Ice Harbor Dam, generally, you brought your lunch; you were there the same hours every day. It didn't have as much influence as it does here, where you have the opportunity to do other things.

Lisa Mighetto: And it sounds like employees were very receptive to it.

John Jones: I know I certainly was when it came.

Larry Haas: I know Alan and I both started about the same, in late 1979 basically, and I think I remember, too, flex time being most of that time, where you decided, you know, core hours are between 9 and 3, and you could choose your start time, and your end time was determined by 8 hours. But anytime between 6:30 and 9:00 you could decide when you wanted your start time

to be and that would be your normal schedule. It's not that you could change your mind every day, but you got to pick what your schedule was within that flexibility and that worked well.

I know I've heard lots of stories of people who worked here before I did, where there were a lot of really stringent rules, and even the dress code was you wore a shirt and tie.

Lisa Mighetto: **Was there a dress code?**

John Jones: Yes, there was.

Larry Haas: Before my time.

John Jones: When I started.

Lisa Mighetto: **When John started, there was a dress code?**

John Jones: You bet. It was rather unofficial, but you were spoken to if you came in and didn't have a tie on and white shirt and so on like that. Whether you wore a jacket through the day or not is entirely up to you, but you better show up in one, and you better have a tie and a white shirt on.

Lisa Mighetto: **Even if you were going to sit at your desk all day.**

John Jones: Exactly right.

Lisa Mighetto: **And had that changed when you came back**

in – was it 1989 when you came back?

John Jones: Well, I helped change it in the first place because I just got to the point where I first started not wearing a tie, and eventually I would wear something other than a white shirt, such as what I have on now. And over a period of time – if you do this gradually, why, we're able to get away with it. But generally speaking, the office has always been controlled by an electrical engineer. I mean, he's always been chief of the office, and they were always the, in my estimation, stuffed shirts, and they're the ones that insist on this kind of thing – the mechanicals and the structural and so on like that, they were more interested in getting the work done, and they were more casual about everything.

Lisa Mighetto: **And they didn't have all that much contact with customers, right?**

John Jones: Practically none. But our chief wanted to look out across the office and see all those shirts and ties.

Lisa Mighetto: **And it was mostly men, right?**

John Jones: Oh, yes. We only had about four women – we only had three women when I was working there that were not office staff, and we only had two secretaries. Incidentally, the two secretaries took care of all of the correspondence, all of the typing of any kind for 100 people in there. And after we evolved a bit,

you have to have a secretary and sometimes an assistant, plus a chief of each one of these. At any rate –

Lisa Mighetto: **Did they have a dress code, too?**

John Jones: They had to dress in some kind of business suit type, you know, women's business suit. We only had – we had Margaret Ball, who was the drafts person for the structural section, I think. We had an older woman who was – she was also part of the structural section, but, I mean, there was even personal interaction between any of these people throughout the entire office. It was really structured, and it was odd, and that's one of the best things that happened is we developed these separate branches because we wound up with some of each discipline in each branch, and it was encouraged for us to talk to each other, you know.

Lisa Mighetto: **It sounds like the electrical engineers were more formal.**

John Jones: Oh, way more formal. Still are.

Lisa Mighetto: **So now you had electrical engineers mixing in with mechanical and the more casual ones.**

John Jones: Right, and now we have a non-engineer as office chief. I'm not sure how that's working out and I wouldn't want to comment on it.

Lisa Mighetto: Well, you were gone for a while. When did these changes occur, and for those of you who were here the whole time, or was it already more casual when you arrived?

Alan Christensen: It was more casual when I arrived. I think there was a transition between in the Corps and also socially, you know, as the area changed and as society changed, the Corps dress style just changed too.

Lisa Mighetto: So you didn't have to wear a white shirt and a tie.

Alan Christensen: No.

Larry Haas: I might add, too, I think it was more culturally and it was more just than HDC because I worked for Ford Motor Company before I came here as an engineer. We did testing on cars, and I was changing part-time cars and working on cars, and I had to wear a tie – a shirt and a tie. And you just tucked your tie underneath your buttons when you worked on a car. As an engineer, you were going to wear a tie.

And so I think part of it is the culture, not just HDC. I think it was the culture of that time.

John Jones: I think that's true because I started to work for Hyster Company in 1963 after I graduated from college, and it was very much that same way – shirt and tie. And it didn't matter what you were going to do. The only exception was if you were working at the proving grounds

or something, testing various bits of equipment, you could wear coveralls over your shirt and tie.

Lisa Mighetto: But it sounds like you had to dress up just to work on a car. That was Ford Motor Company, though, right?

Larry Haas: And they were new cars, too, so they weren't that dirty either.

Lisa Mighetto: Well, is there anything else that you would like to add that we haven't talked about in terms of important developments that we should be sure to include in the history?

John Jones: I don't think so really. I think that we developed into a much more coherent group in the past fifteen years than there ever was before, and I think people are more nearly comfortable with dealing with any one of the disciplines than we were before.

I will say this: when I came back to work for the Corps in '89, I went up to Ice Harbor and truly those people became a family to me. There's a different attitude at the projects from here. If anybody needed anything, if you got sick, you know, whatever happened, they were there for you as though they were family.

Lisa Mighetto: Is that because it's smaller?

John Jones: I don't know. It's less like that here in my estimation, but I've found the same thing at each of the projects

that I've visited. They have the same kind of an attitude. I think it's because it's like a little community all by themselves. Most of these projects are rather remote. I mean, there are not people around close by.

Lisa Mighetto: And here you're in Portland.

John Jones: Well, here's one thing, though. I got sick when I was up there and people donated leave for me, some of it from right here at HDC, even though I was up at Ice Harbor Dam. So there is some kind of communication there and, I mean, in general there has been an attitude of you're part of our family, so whatever needs to be done, we'll help with. That's not universal, but it's broader that way than anyplace I've ever seen outside the Corps.

Larry Haas: One thing I might add, too, for HDC, over the years that as an organization, and maybe this is Corps, too, and not just HDC, is that we have become less "stovepipe," where you have to go through your supervisor, and he goes through his boss to have someone talk to somebody else, or have a change made, where we become more team-focused, more people friendly, where we talk amongst ourselves with the teams to work out things that need to be worked out amongst people. We're more people-focused; we're more customer-focused. We don't tell people what they have to do, either the project they have to do, or what another person or another branch has to do. It's more that we work together to

define what the goal is, what the problem is, what needs to be fixed, and we work together to solve problems. And I think it's more cohesive and more – I'd almost say more family-oriented.

It's harder for maybe some of us who are more design-oriented, where we like to work at our desk and solve a problem by ourselves, where it's forced us to be more working together and maybe more meetings and more talking to other people to get buy-in to solutions to problems.

Lisa Mighetto: So that was a change for some people.

Larry Haas: Yes.

Lisa Mighetto: But you think generally employees are receptive to that change, and see it as a positive thing?

Larry Haas: I think overall it's a very positive thing.

John Jones: I agree. I certainly agree with that, and especially over the last six, seven, eight years, my impression of the Corps has improved a lot. When I first came to work for the Corps in '67, I, like most of the general public, felt that these government workers – the Corps of Engineers and government workers in general – were people who couldn't get or hold a job anyplace else, and I found that not to be the true case. The Corps and government in general have a lot of very talented people, and most of them are quite dedicated. And what the public perceived as incompetence was one of, as

Larry said, "stovepiping." In other words, they couldn't make a decision – I mean, they've made the decision internally, but nothing is going to happen until you get the approval of your immediate supervisor and his supervisor and his supervisor.

An example – I was given a design task back in about maybe 1970 or '71, and I said how much time do I have to do this? And they figured I had about roughly eight weeks. And I looked at the job and I thought okay, I can probably get the design work done in that period of time.

Oh, no, that's not the time you have altogether, because it has to be reviewed here, and then it goes to be reviewed at OCE, and then it has to come back here, and then you have to work on it, and it has to be reviewed and so on like that. By the time they got back down to it, I had less than a week of design time. All the rest of it was other people that had to look on and pass their blessing on it.

Well, when something like that is happening, you certainly can't look very productive. That's really what it amounts to, and what it caused was a lot of projects being put out incomplete, that had to be reworked later. And this was always a sore point for me. And I don't know whether that exists now or not. Larry?

Larry Haas: It's improved. You always – always like to have more time than you have, it seems like. But it's definitely improved.

Over the years we have become less "stovepipe," where you have to go through your supervisor, and he goes through his boss to have someone talk to somebody else... We're more people-focused; more customer-focused. We don't tell people what they have to do. It's more that we work together to define what the goal is, what the problem is, what needs to be fixed, and we work together to solve problems.

John Jones: And this is another thing. Those of us who were doing the work never had any input in the time estimate to do the work.

Larry Haas: That's improved there.

John Jones: We were never involved in it, and so you had a project given to you with a time frame imposed on you by people who really didn't understand what the problem was. And that's one of the reasons I left the Corps in the first place. I finally just got disgusted. In '79 I left and I said "Sheesh; I'm out of here. I wouldn't come back to this place for anything." And after I went back to work in '89 for the Corps up at Ice Harbor, I thought I've been wrong, those are really good people. And I came back . . .

Lisa Mighetto: It sounds like things had changed, too.

John Jones: Well, things had changed a lot, and when I came back here, I was greeted warmly. Some of the people that had been here previous turned out to be my supervisors when I came back – I was supervising them when I left. And I must have treated them fairly well, because they treated me nicely when I came back.

But, yes, overall I'd have to say that I think the Corps has improved a lot, and that it's a good place to work. So, I'm leaving on a positive note.

Lisa Mighetto: Well, thank you.



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INTERVIEW
3

Interviewees: Mark Pierce and Robert Reynolds

By Lisa Mighetto
November 17, 2004
Portland, Oregon

Lisa Mighetto: This is the HDC interview, November 17, 2004, Portland, Oregon, and we're here with Mark Pierce and Robert Reynolds. Why don't we start by having you both introduce yourself, say a little bit about your educational background, training, and when you started working for HDC.

Mark Pierce: I'm Mark Pierce, electrical engineer, Bachelor's Degree from Seattle University. I started here - well, actually I started with the Corps in the Alaska District in 1975, and moved to Chief Joseph Dam during major construction of the last 11 units in 1977, and came to HDC from there in 1985.

Lisa Mighetto: And you've been there ever since?

Mark Pierce: Yes.

Robert Reynolds: I am Robert Reynolds. I'm an electrical engineering technician. I have a high-school degree. I have some college. I never graduated, but decided to utilize what I had, and I got hired back in 1979 in Design Branch for Portland District, and worked there primarily doing 120-volt power and controls of lighting. I transferred to HDC in June of 1990, where I went to the Major Electrical Equipment Branch or Section and worked on generators, exciters, etc., up to this point.

Lisa Mighetto: And what are your major responsibilities?

Robert Reynolds: Well, the major responsibilities of a technician are to be prepared to assist the engineers in the performance of their duties. In effect, we need to have, I guess, a fundamental knowledge of just about everything that is going to come around so that we can assist.

I am one of the higher graded technicians, so I do get jobs that I work on a stand-alone basis by myself, and whenever I run across problems you go talk to your mentors and network with them, and make sure you get the proper answer to get the job done.

Lisa Mighetto: And how about you Mark?

Mark Pierce: I'm a senior electrical engineer, and as such I guess we tend to be a little bit more in the way of specialists, some of us, and also

team leaders. So we get involved in more complex jobs as a general rule as part of the team.

Lisa Mighetto: Do you two work together?

Robert Reynolds: All the time.

Mark Pierce: And something I would add for Robert's discussion about the techs, is the senior techs like him are really designers. Most of the time they're working independently. Very little of their time actually ends up as being support for engineers. Our techs at the 9-level and below tend to be the ones that do the most support work. So Robert is really kind of indistinguishable [from] an engineer for most tasks that we perform on the floor.

Lisa Mighetto: What attracted you both to this work? You both worked in other areas before you came here, right? Some people I have interviewed just came to HDC and stayed there, but you came from somewhere else.

Mark Pierce: Yes. I came here because I wanted to get a more rounded knowledge of hydropower. I started out in a district that did military construction.

Lisa Mighetto: Alaska?

Mark Pierce: Alaska. I got a little taste of hydro there because that district also supported the Snettisham first two units' installation in Alaska. That office did the transmission line design

from the power plant in Juneau. It was pretty much over by the time I got there, but it made me interested.

And then when I visited Chief Joseph during one of the engineer in training tours while I was still training in the Alaska District.

Lisa Mighetto: "Engineer in training," then.

Mark Pierce: Yes. That made me real interested, so when the opportunity came to get a position at Chief Joseph Dam in the project office, I took it. And while there I worked both in Operations and Construction. I transferred to HDC because I wanted to see what the engineering side looked like.

The unfortunate thing for me is that I arrived at HDC just about the time we stopped doing much in the way of major design of powerhouses and really switched more to a rehab mode.

Lisa Mighetto: So that was in the mid-eighties.

Mark Pierce: Yes.

Lisa Mighetto: How about you Robert?

Robert Reynolds: Well, I made the switch primarily because - well, it was kind of a twofold reason. One, in Design Branch they were making comments or a bunch of noise about dropping some of the technicians, and as far as the FT allocations - what do they call those?

Lisa Mighetto: Full-time employment?

Robert Reynolds: FTE, yes. So this job opened up over here and I took it, and one of the reasons that I wanted it was at the time, HDC was making a transition from using AUTOCADD software to Microstation software. I had been trained on Microstation software, and it kind of helped HDC segue into that. So for the first couple of years I was, as far as Microstation is concerned, I was the man. Now I have to ask them how to do things in Microstation.

Lisa Mighetto: Did you train people in Microstation?

Robert Reynolds: No, we had formal training, but formal training is formal training. The best way to learn CAD software is to sit down and just do it. And once they have the formal training, they could come to me and say well, how do you do this, because these are things that I know. You get four or five days of enhanced training with all sorts of information being thrown at you in an eight-hour day, and you don't retain that too well.

So, when it came time for other technicians to make drawings, or create drawings, if they had forgotten something, then I was kind of like their safety net. I was there to let them know what needed to be done. And once I got here, I started as a GS-9 technician, but during the course of this, say about two or three years, I did achieve GS-11 status, and that was because of added responsibilities as far as design

capabilities and things that you do. And Mark, at that time, was my supervisor.

So we set up a plan to get me to that level and make sure that I had the necessary training or experience to do the type of work needed to be a GS-11 technician, which is, for the most part, as Mark said earlier, not different than your standard, I guess, GS-11 engineer as far as the duties. Sometimes I think I surpass them, but then that's just me.

Lisa Mighetto: Was that a tough transition for people from AUTOCADD to Microstation?

Robert Reynolds: Yes. Sometimes engineers, just by their nature, they can be fixated, so to speak. They know one way to do things and they don't necessarily – not everybody, but they don't necessarily welcome change. You know; if it's not broke, don't fix it.

Lisa Mighetto: Who initiates that change? I mean, who decides okay, now we're going to go to Microstation?

Robert Reynolds: That would be management. But that was mandated by – I think by Headquarters in D.C.

Lisa Mighetto: Oh, and you said that had already been done when you got there. That was one of your first responsibilities.

Mark Pierce: Was that part of the Intergraph suite of software that the Corps . . .

Robert Reynolds: Yes.

Mark Pierce: . . . was beginning to implement? There was a period when it looked like the Corps of Engineers was going to standardize on a particular suite of design software that would essentially make us paperless. And Intergraph was the primary contractor. I think Huntsville was the Corps proponent for that. I never saw it get fully implemented. Did you, Robert?

Robert Reynolds: No.

Lisa Mighetto: So even to this day . . .

Robert Reynolds: Right. That's something we're still grappling with. We have a mix of design software packages in this office. We're pretty much our own agent, our own purchasing agent, and we'll never be paperless. Never.

Lisa Mighetto: Are there – go ahead . . .

Mark Pierce: I was going to say, too, that the type of work we do requires a lot of different software tools. Microstation is a graphic design software package, but a lot of the work that people in our office do in many cases is performance specification for specialized vendor-designed equipment. So that sort of software isn't useful to us. In fact, there may be no existing software out in the market that would be applicable to what some of us do in terms of specifying station equipment – generators, turbines.

Lisa Mighetto: You need more custom ...

Mark Pierce: Yes. It's a niche design area that you just don't see the software providers really going into it in a big way. There's not enough market, I think, for that type of equipment design.

Robert Reynolds: Our agency is basically known as a center of expertise. We have an expertise in power generation. Basically, if you want to know about power generation, you come to us. We have plants and that's pretty much what we do as far as rehab of the existing plants that we do have.

But in saying that, other companies out there that may have software that might perform the same things that we do wouldn't be as specialized because of the different complexities that we see come up on a job-by-job basis.

I've been in HDC for 14 years, and every job I get is – there's some area in it, some little hook in it, or something that occurs that is new to me. So, in that instance, it's generally a constant learning process. You're always – something is always coming up, some new wrinkle, some new development, because you can't see it all in a job. And in the same instance, you wouldn't see the – you wouldn't see a boiler-plate type specification, a boiler-plate type of drawing or plans to go along with that, where everything just lined up just nice and neat, and you could just – oh, here's a buy-out, pull it out . . .

Lisa Mighetto: Not cookie-cutter, huh?

Robert Reynolds: No, it's definitely not cookie-cutter. Every plant has its own little individual quirks that you need to take into account, and that's why there isn't really a software vendor out there that can really satisfy our needs, because there's so many different ways you can go.

Lisa Mighetto: Where are most of your projects? Are they here in the Northwest, or do you work back East? There is a Central and an Atlantic Branch, right?

Robert Reynolds: Yes. We work in Pacific Branch. So our projects are on this side. On the Columbia, for the most part of the Portland District, on the Columbia River and on the Willamette River. In Seattle District, we have stuff on the Upper Columbia; Walla Walla District, Snake River and other rivers up in Montana and Idaho.

Lisa Mighetto: So when you're talking about differences among the projects, you mean in the Northwest. It's not – it's right here.

Robert Reynolds: Well, for what we see there are differences heard out there, cultural differences are not, but in Central and Atlantic as well. So it depends on whom you're working with and how you're working with them. I luckily haven't had to work with any of the plants in Central or Atlantic, so I guess I can't really talk about it, but from what I heard other people say, we'll do some things a certain way, and the district down in – a district in Central Branch

may do it just a tad bit differently. Another district may do it a little bit differently as well. This kind of goes with the flow. We kind of – we're the center of expertise, but we are working, for lack of a better word, the other districts that are out there, and they come in and they request a service from us. So, in essence, we are basically working for them, and because we are working for them, we have to be adaptable to their needs. We can't do what we do in a cookie-cutter fashion. We have to be able to adapt to whatever rules and regulations that they have.

Lisa Mighetto: And Mark, you ...

Mark Pierce: Yes, I would add to that, too, that the customers that we work for have plants, many of them built back in the fifties by groups other than HDC. The Corps of Engineers had a number of different design centers, and they did things a little bit differently, even though we were all working from the same overall design manuals – electrical and mechanical design manuals.

So you do see some differences in overall design approach for particular powerhouses in different areas of the country.

Lisa Mighetto: So that's outside the Northwest. Would that apply within the Northwest, too, or they were all designed by ...

Mark Pierce: Well, believe it or not, there are still some pretty wide variations here. There was

no design center at all when Bonneville Dam was built. I'm not exactly sure who the actual design office was that handled that one back in the thirties. I guess HDC, as we currently know it, started – when did it start? I'm not exactly sure.

Lisa Mighetto: The fifties.

Mark Pierce: And none of the people that we've dealt with actually were here earlier than in the mid- to early sixties. Our first design documentation from OCE appeared in about the mid-fifties, and that's the point where we actually got some standardization, and that's when you see an overall commonality of design from that period.

We had competing design centers up to the time I was here. We closed down Mobile and Omaha.

Lisa Mighetto: Competing? You mean you were after the same projects?

Mark Pierce: It was actually turning out that way, because the Corps stopped new design, pretty abruptly.

Lisa Mighetto: So that was in the seventies before you both got here.

Mark Pierce: Right, so that by the time I got here we were pretty much finishing up projects that had begun in the seventies, and we were concentrating on small hydro and most of those never actually materialized. We did Town Bluff, which is now R. D. Willis Powerhouse. It's the only

small hydro plant I can remember that we did.

But to get back to that competition issue, we had these design centers at Mobile and Omaha, and also here in Portland, which had been doing new construction work. All were now trying to find a niche for themselves as the mission shifted from new construction to support of old existing power plants. There was also a group of engineers in Little Rock District that really would have liked to have been designated as the rehab design center.

At about that time, a huge wave of retirements of the Korean War generation took place, and kind of decimated the older staffs in all of the centers at about the same time, so that I think the consolidation came to be a little bit less contentious than it might have been.

Lisa Mighetto: **Why Portland? Why not in Omaha?**

Mark Pierce: Well, I think Portland for two reasons. One is that we probably had the biggest concentration of hydro in terms of installed units. Omaha is fairly large, but I think we're quite a bit larger than any of the others were. We're larger, and I think we had a pretty dynamic manager in the form of Glenn Meloy, who worked hard to make the case that we didn't have enough work to support multiple design centers. We needed a group large enough to have a dynamic relationship where we could sustain our own expertise and get the benefits of bringing engineers

together in the same location. It looked like we were the best place for that to be, and the argument appeared to have been successful.

Lisa Mighetto: **You mentioned a lot of people retired because they had aging staff in the other – or maybe all of the centers. Did some of them come here?**

Mark Pierce: Actually, no, that was the big surprise. When they closed down, I don't know that we picked up anybody from the other design centers.

Lisa Mighetto: **So it was all Portland.**

Mark Pierce: Yes.

Lisa Mighetto: **That's interesting.**

Mark Pierce: Maybe that was an indication of how bad the work situation had become. I would have thought we would have brought some of those people here. I think most of them preferred not to leave where they were, and found work in their Districts. But I don't know that we suffered any real consequences by absorbing their work without absorbing their people.

We did maintain a Mobile forward office, and kept several engineers in that office. That's really the only cluster of engineers outside of this building that currently are designated as part of the center of expertise.

Lisa Mighetto: **Well, what do you both see as the most**

...we probably had the biggest concentration of hydro in terms of installed units ...

...we had a pretty dynamic manager in the form of Glenn Meloy, who worked hard to make the case that we didn't have enough work to support multiple design centers.

significant development since your time here, since you started here? I mean, we've already mentioned a little bit the change in software.

Mark Pierce: You want me to start? Well, certainly for me it was the transition to maintenance support and rehab from new construction, and it's a big change because there was a different skill set involved. We no longer have the need for a lot of structural type people, for instance. But we had more and more need for specialty areas of turbines and rotating machines, generators and their support systems, governors and exciters, large transformers.

Lisa Mighetto: Was this recognized in the mid-eighties when you came on board?

Mark Pierce: It was becoming that way. I mean, I think the hope was that emphasis on small hydro, had it taken place, and would have allowed us to keep that group of disciplines together because you would be building new buildings as well as purchasing equipment, just in smaller versions. That didn't pan out, so we really . . .

Lisa Mighetto: Why didn't that pan out? Somebody that I talked to yesterday on a completely different project was talking about small hydros and said that . . .

Mark Pierce: I think it was the lack of sponsorship. One of the things that was happening was a de-linking really of the Corps and development at its sites. When the legislation came out to require

local participation, when you had a local participant that was required to pony up 20 percent of the cost of this project, they were very often unwilling to use us as their design agency.

There was a lot of frustration with the Corps in terms of its responsiveness, its cost and so on. The Corps made some attempts to address that by developing its project management structure that really starts from about that time, where you have actually a project management person that answers directly to the District Commander at each district.

Lisa Mighetto: So since you've been here that's been . . .

Mark Pierce: Yes. So that was a direct attempt by the Corps trying to be more responsive to its nonfederal sponsors. But even at that, at least up in this part of the country, we just haven't seen a large number of nonfederal sponsors appear to fund any major work. And in some cases in other parts of the country where those sponsors appeared, they opted not to use the Corps.

We've had a couple of small hydro developments here, two done by an irrigation district. There's one small powerhouse at McNary, and the other one is The Dalles. They're really tiny little plants, Chinese generators and turbine. They capture a bit of water that is otherwise discharged for fish attraction.

Lisa Mighetto: Chinese generators?

Mark Pierce: Yes. And we had no part in the design of these small plants, except to look at them in terms of interface with our systems, and, unfortunately, that's the kind of thing that was probably going to happen if there was going to be much development in our powerhouses. And even that small amount never really took off beyond those two units. I'm not aware of any others.

There was a half-hearted attempt by a utility, I think, in Utah who tried to develop some hydro up at Dworshak using existing penstocks for generating units that were never installed. But the only way it worked out economically was if we gave them water that we were otherwise using part of the year. So it didn't work out either.

So basically, if it wasn't federally funded, it wasn't coming here. We still had a major rehabilitation program funded through appropriations - congressional appropriations.

Lisa Mighetto: And you mentioned it was a different skill set that addressed that than construction.

Mark Pierce: Yes. Much more emphasis toward the large equipment - electrical and mechanical equipment, much less on the structure, because the structure largely doesn't change when it's upgraded.

Robert Reynolds: On the managerial side, one of the things that HDC did in order to better relate to their clients, one of the

big changes here was when we changed to regional groupings, and they'd internally changed the different branches – the Pacific Branch, Central Branch, and Atlantic Branch. Before then we were separated by disciplines. We had an electrical section, mechanical section, a structural section, and they handled the entire country. We weren't split out for a branch to handle this area, a branch to handle that area, and so on.

That change was made to give us better – I guess to give a better – what's the word I'm looking for – interaction between our clients that are way out down somewhere else. We have people in that section, we have PMs working with them, and it doesn't separate us – it didn't separate the electrical section as much. We had somebody working over here, and then you also had that same person working on something else across the country.

I think we may be in the process of switching back to the system that we had when I did start here, and that was more of a discipline type of setup where we'd have mechanical, electrical – I don't think we'd have structural anymore, although we might have – a tech section or something along those lines.

Lisa Mighetto: And why the transition back?

Robert Reynolds: At first there was a lot of work that needed to be done as far as the rehab with this, but that rehab is winding down, and the other sections – the Central Branch and

the Atlantic Branch – doesn't have the volume of work that they did. But Pacific appears to have more than what they can handle.

Lisa Mighetto: Is that because they have more projects, bigger projects?

Robert Reynolds: Well, that I'm not sure [about] – probably.

Mark Pierce: I think the bigger impact is the fact that BPA got direct funding here about ten years ago, and Congress – and the administrations have been parsimonious with funding.

Here we have BPA through ratepayer funding continuing to provide funds, including for some major rehab of McNary Dam, the first non-Corps rehab program. Because there's so much work, we have a number of people from the other branches actually working for us full time on our jobs.

Lisa Mighetto: Here, or do they work from . . .

Mark Pierce: They still sit at their desks over in the other groups, and their supervisor still is the branch chief for that particular branch, but they might as well be working for us, and that's part of this shift that's likely to continue.

Another aspect of it is the maintenance of expertise issue. By breaking apart in the geographical areas, we almost have three little HDCs and we have to overcome that by keeping a lot of communication open between the three branches to make sure that we're not

diverging and following different design paths, or losing the skill sets that we need. So we've had programs to try to maintain expertise, including a monthly meeting in the various disciplines. But they're not altogether successful.

We're trying to put together design documents, which we have not done much of in the past, largely, I think, because our disciplinary structure kept specialty experts up to speed. Now we've broken ourselves apart so that there's not a mechanism –

Mark Pierce: . . . and I think there's a realization that we still need specialty skills because we offer something nobody else in the Corps of Engineers does, and that's knowledge in generators, turbines, and the control systems that go with them. And we've got to preserve that.

As Robert said, there seems to be some momentum toward reorganization. I'm not sure that we'll go back to the disciplinary structure we had, but it might be somewhere in between.

Robert Reynolds: One of the – back in the day when we were in disciplinary type of branches, we had people that specialized in, or had particular talents for a certain area, and those type jobs that came in, if it was your area that you specialized in, it kind of gravitated toward you. So when we split up into three different branches, if you didn't have three different people that specialized in the same thing, one branch would be lacking a specialist

as far as that particular – that particular job or that particular piece of equipment.

Lisa Mighetto: What's an example of a specialist?

Robert Reynolds: Someone that is very knowledgeable in a special area or field of hydropower.

Mark Pierce: Say generators, for instance. What we had were people who our vendors called sophisticated users. We had people who not only understood how this equipment fit into a powerhouse, but they had some significant amount of knowledge about how the manufacturer designed this equipment, so we could help our maintenance people understand the limitations of the equipment. And that was something that took time to develop, and it needed a certain amount of mentoring, which takes place almost naturally . . . in the disciplinary structure. It's much more difficult in the structure we're in now.

The big problem for us has been trying to maintain those groups so they're available to service those customers in geographical areas and still have the necessary technical interchange to develop new people that are coming in.

Lisa Mighetto: Okay. Are there other developments that we haven't talked about that you've noticed?

Robert Reynolds: Well, there's one that I have noticed. I'm kind of somewhat hesitant

to speak on it too much, but there does appear to be a lack of minorities in this office.

Lisa Mighetto: Has that changed recently, or has that always been the case?

Robert Reynolds: It's always been that way. There is a plan in the works, so to speak. You can't have a plan per se, like I'm going to go out and hire four women, or four of this minority or four of that minority. It really doesn't work like that. But there is something in effect where management is going to be more aware of the fact, and they're going to do different things in their efforts to locate new people to come in and work in HDC, and I'm all for that.

Maybe they will look, or do recruiting at – recruit maybe in a slightly different fashion, or . . .

Lisa Mighetto: Generally, how does the Corps recruit?

Robert Reynolds: Well, right now you're speaking to what I playfully elect to call myself, a grunt. Work comes and it gets put in front of me and I do it.

Over the span of 14 years there have been changes all around, but they are changes that for the most part have been above the area that I sit. I'm going to do – I have done the same thing for about 14 years, and it really didn't matter if we were in electrical, mechanical, or structural type of format, or we were in a format for regions. My job, for the most part, hasn't changed. I still do the same thing

that I have done, so all I can really offer you are observations that I might – observations that I have seen, founded or unfounded.

Lisa Mighetto: What percentage of the staff is minority? Can you estimate? I'm sure I could get those figures.

Robert Reynolds: Yes, you probably can, but you'd have to define minority. If you're going to include women as well, it's going to rise. If you don't include women, let's just say you say – well, for example, let's take African Americans, I being one. I would say in this office 1 percent. That might even be low. It's probably not right.

Lisa Mighetto: And you're talking about HDC only, not just the Portland District.

Robert Reynolds: I'm talking about HDC. The Portland District probably rolls up to about 7 or 8.

Lisa Mighetto: That's interesting. Then the question is why is HDC . . .

Robert Reynolds: There's numbers of speculations on why. We could get into conversations for hours trying to pin that down. But let me just say that it's a situation that management is aware of, and they're working – they're working diligently to diversify, and do it in a correct fashion.

Lisa Mighetto: What about the size of the staff generally since you've both been here? Have there been major changes?

Have you seen it contract or expand?

Mark Pierce: It's contracting.

Lisa Mighetto: Okay.

Mark Pierce: Yes, although it may be not as much as you would think. In terms of when I arrived here, I'm not sure that our gross numbers are all that much lower.

Lisa Mighetto: How many people work for HDC now?

Mark Pierce: Around 90 is my guess.

Lisa Mighetto: And when people leave, is it because they're retiring? They haven't been RIF'd recently, right?

Mark Pierce: No, we haven't had any RIF's lately. It's just normal contraction.

Lisa Mighetto: Didn't you say 40 percent were about to retire before we turned the tape on? Oh, 40 percent new people.

Mark Pierce: Yes, in just that fairly short time.

Lisa Mighetto: That's a lot of new people.

Mark Pierce: Yes, and that's part of the problem we're going through is how to get them up to speed, and the fact that we didn't have a lot of documentation... the Bureau of Reclamation. We haven't kept up a library of what documents we do have or written doctrine, design, goals, philosophies. Really the

doctrines we're working off of were developed in the fifties, and slightly updated in the eighties, and we don't really have a lot of detailed information to help new hires.

Lisa Mighetto: So what do they do? Is there an orientation program?

Robert Reynolds: Inside HDC now they are implementing a new mentoring type program, and it's still relatively new, so we couldn't really tell you how it's going to turn out, what the results are. But it's in place, and maybe a year or two from now, or four, five years from now, the people that are in that mentoring program that are being mentored by the veterans that are here, gleaning knowledge from them, perhaps we'll be able to see the fruits of that.

Right now it's still fledgling. It's still new, and the bugs are being worked out and we'll see if it works out.

Lisa Mighetto: Well, is there anything either of you would like to add?

Robert Reynolds/Mark Pierce: No.

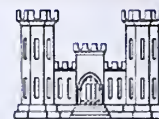
Lisa Mighetto: Well, thank you both very much.



Pacific Branch staff include (from left) Rod Hurst, Ron Leahey, Varis Ratnieks, Jerry Joy, Dave Bardy, Emiko Hanson, Jim Folgate, Russ Reynolds, Rod Wittinger, Del Kester, Dan Ramirez, Jim Gumm and Marjorie Dukes. (Not pictured are Scott Bennett, Chris Gantenbein, Phil Gruwell, Larry Haas, Ed Miska, Mark Pierce, Robert Reynolds, Rich Vaughn and Dan Watson.)



ENGINEER TRAINEES



1967 - 1968

U. S. ARMY ENGINEER DISTRICT, PORTLAND



Left to right: Jerry L. Weaver, Steven R. Brockschink, Thomas R. Thorsen, Charles N. Cole, Clyde E. Barnhill, G. Paul Willis, Brian A. LeVee, Curtis W. Faulconer, John R. Kelley, James R. Ellis, William J. McGinnis, Michael E. Tyrrell, Randal W. Dickinson.



HYDRO
ELECTRIC
DESIGN
CENTER

INTERVIEW
4

Interviewees: John Mayer, Ron Leahey, and Gerald Joy

By Lisa Mighetto
November 17, 2004
Portland, Oregon

Lisa Mighetto: Good morning. This is the HDC interview with Lisa Mighetto on November 17, 2004, Portland, Oregon, and I suggest we start out by having each of you introduce yourselves briefly. Tell how you came to work for HDC, how long you've worked there, and what positions you've held.

Ron Leahey: I'm Ron Leahey. I've worked for HDC since 1966, and been with them ever since as an electrical engineering tech.

John Mayer: John Mayer. I'm an electrical engineer. I started at HDC in 1986. I worked in private industry before I came here, and not in the power generation field at all. I was in computers.

So, I started as a temporary employee for a three-month job here, and it got extended, and after a couple of years I became a permanent employee, and I've been an electrical engineer the whole time, and I've been in HDC the whole time since 1986.

Gerald Joy: I'm Gerald Joy. I graduated from Oregon State in about 1964, and I worked four years for the Oregon State Highway Department, and in the field doing bridges here in Portland. I got tired of that work, so I did a little bit of interviewing. I interviewed for the Corps at HEDB in the old Federal Reserve Bank building, and was hired. That was at a period when HDC was – HEDB was designing a lot of powerhouses in the Northwest. It was probably the peak – near the peak of their powerhouse design.

Lisa Mighetto: And when was this?

Gerald Joy: 1968, and I retired in 2002, and spent my whole – except for one year, I went over to Portland District and then came back to HEDB. I spent all my time then at HDC.

Lisa Mighetto: What attracted you to this work? I mean, you've touched on this, but how about the rest of you? Why did you want to work for HDC?

John Mayer: I don't know. Really, I was unemployed at the time, and my first daughter was going to be born one week later, and I had been unemployed for the past three years prior to starting to work for the government, just building a house. I left my job in California, came

to Oregon and I actually was living in Washington at the time, and building a house on some property I owned.

So I was unemployed. I had my resume in with the government, and I got a call and they said, can you come for a temporary job? And I don't think there was even an interview other than a phone call. And so I think I was here about a week later, and doing sort of computer work, which was evaluating some control systems that were going to go into a dam. And so that was – my background was in computers, and this was kind of computers, and I had – my mother had worked for the Corps of Engineers way back during World War II, and . . .

Lisa Mighetto: Portland District?

John Mayer: She had worked in Honolulu District, and she worked in Washington, D.C., as well, until she got married. She was there during the war in Hawaii. And I also did have an uncle who worked with the Corps of Engineers, Portland District, until about – until he retired in about 1970 or so. Those weren't any ties other than the fact that I knew about the Corps of Engineers, I guess, through them.

But anyway, it was just – I had worked for the Forest Service prior to – during college prior to working on my other job on computers in California. So I had a little bit of government experience, and that was an incentive, because you get some

benefits from prior government work.

Lisa Mighetto: You worked in computers for the Forest Service?

John Mayer: No, Forest Service was working on a road crew building roads, and it was just summer jobs for four summers. So that was back in – it ended in 1970. So I started here on the Corps in 1986, and anyway, it was . . .

Lisa Mighetto: And you stayed.

John Mayer: . . . electrical engineer. Yes, I stayed. It started out as temporary work, and actually there was a lot of ifs. They didn't know if they could keep me because there was limited funding back at that time for certain jobs. So it was worth – I mean, they had to keep extending it. I mean, back then for my position, they kept extending it.

It was kind of a month at a time for a few months, and then they got enough funding to make it last for – I think for two years, a temporary position. There was no health insurance for me back in those days, and when they advertised a permanent position, I think it was actually a permanent term position. That's how I first got into it as a GS-11, I believe. I continued on – they advertised a permanent position sometime after that.

Lisa Mighetto: And Ron, how about you? What attracted you? It was HEDB when you got here, right?

Ron Leahey: It was HEDB. I was going to college and I thought well, for a summer job, you know, I would just apply for a federal employment job, you know, just for the summer. And so I got a call from HEDB, and they wanted to know if I would be interested in an interview.

I said yes, and I went down for an interview, and they hired me right there on the spot. And I thought well, I'll just work here for the summer and then go back to the school in the fall. Well, I'm still here after all these years!

Lisa Mighetto: Where were you going to school?

Ron Leahey: I was going to Multnomah College, which is now the University of Portland.

Lisa Mighetto: But you must have liked the job.

Ron Leahey: Yes, it was interesting and challenging work.

Gerald Joy: Like I said before, I was doing fieldwork, construction-type work at the time, and I wanted to do design work. And so when I found the design office at HEDB, I was really happy. I liked the people; I liked the work.

Lisa Mighetto: And did you two know each other? You were there at the same time.

Gerald Joy: I think so. Yes.

Ron Leahey: Yes. You were structural; I'm electrical.

Gerald Joy: I'm a structural – I don't think I mentioned it at the beginning that I'm a structural engineer and I did mostly structural steel designs.

Lisa Mighetto: And you're electrical.

Ron Leahey: I'm electrical.

Gerald Joy: He's electrical. And back at that time the three departments were all pretty well split up in three different areas of the building, and so we didn't cross paths too much.

Ron Leahey: No.

Lisa Mighetto: How many people are in each section?

Gerald Joy: Well, at that time I think there were about 125 folks in HEDB, the whole group.

Ron Leahey: There were 125.

Gerald Joy: Yes, is that about right?

Ron Leahey: You said thousand – you said 125 thousand.

Gerald Joy: Oh, thank you.

Lisa Mighetto: So 125.

Ron Leahey: We had a lot more employees back then than we do now.

Lisa Mighetto: No wonder you didn't know each other.

Gerald Joy: And they were about evenly split up, I think,

between structural, mechanical, and electrical, and I remember basically in the structural department we had about 25 structural engineers, and then the support people that go with them, the draftsmen and so on. And now in HDC there are two structurals [engineers] in this office, Ray Dewey and Sharon Demeaux, and that's it.

That shows you how busy we were back then compared to how busy the office is now, in the actual construction of powerhouses.

Lisa Mighetto: Okay, and we're going to get to that because I think that's our major development. Did you work in areas other than Portland or on the Columbia River? I mean, HDC has – don't you have regional offices on the Atlantic, or were you based here?

Gerald Joy: Yes, HDC covered the whole Northwest. There is a Portland District, Seattle District, Walla Walla District, and Alaska District, and HDC worked for all of them. And we worked on powerhouses in all of those districts. In Alaska we did Snettisham, in Walla Walla District we did Dworshak, and the four Snake projects, Ice Harbor, Lower Monumental, Little Goose, and Lower Granite. And then on the Lower Columbia coming down McNary, John McNary, John Day, The Dalles, and Bonneville. And that was in the early days. And then when it became HDC and we started doing national work, of course, then we spread out and did a little more work in the field.

Lisa Mighetto: Okay, so that was later.

Gerald Joy: That was later.

Lisa Mighetto: When did that occur?

Gerald Joy: The mid-eighties, when we became the National Center of Expertise. Yes, I think we came over to the Customs House in 1979, I believe.

Ron Leahey: Seventy-nine, yes, and then it was around the mid-eighties we became the National Center of Expertise.

Lisa Mighetto: So around when you got there.

John Mayer: Must have been. Most of my work was still Northwest when I came.

Lisa Mighetto: So basically you worked on the Columbia River and in Alaska.

John Mayer: Yes, and on the Snake River, Clearwater River where Dworshak is. Libby, Montana, is on the Kootenai River, I guess is the way you say it, almost on the Canadian border from Northern Montana. There was New Melones we did in California.

Lisa Mighetto: Was that in the seventies?

John Mayer: It might have been eighties for New Melones. New Melones; that would have probably been early eighties.

Lisa Mighetto: So that was before the Center of Expertise...

Ron Leahey: That would have been – New Melones, late seventies. I remember now.

Lisa Mighetto: So you did work outside of the division, right, the Northwestern Division.

Ron Leahey: A little bit. And wasn't that a Bureau of Rec – how was that New Melones? Was that Corps? Now it's Bureau of Rec.

Gerald Joy: I don't know.

Ron Leahey: The Corps built it but then it got turned over to someone else.

Gerald Joy: And Chief Joe. I didn't mention Chief Joe in Central Washington was a big project for us. It has 27 units, and we put in units 7 through 27.

Lisa Mighetto: And when was that? That was Jerry.

Gerald Joy: That would be the seventies.

Ron Leahey: Seventy-four, five.

Gerald Joy: Yes.

Lisa Mighetto: Well, you mentioned the Bureau of Reclamation. Do other agencies have the equivalent of HDC, or is the Corps distinctive there?

Ron Leahey: They do and the Bureau of Rec has an office in Denver that does basically the same thing that we do here.

Lisa Mighetto: Do you know how they compare in terms of size or . . .

Gerald Joy: The Bureau of Rec is large, as is the Corps. I think the Tennessee Valley – TVA Authority also must have a large design team as well. It's in the South.

Lisa Mighetto: And that was Jerry.

Ron Leahey: In fact, we have gotten a few people from the Denver Office of the Bureau of Rec, that came here like Dan Ramirez and Ron Cleys.

John Mayer: And Al Lewey.

Gerald Joy: Ron Cleys, who is retired.

Ron Leahey: Yes, quite a few of them that got downsized back there have come out here to work for HDC.

Lisa Mighetto: Okay, you've touched on this already. What do you think are the major developments that have occurred during your time at HEDB, HDC? Just looking back over your time here.

Gerald Joy: At the time I came in 1968 through the late sixties and early seventies, electrical demand was in great supply, and so the hydropower industry was going full bore. And like we said before, we were designing maybe three or four powerhouses at one time, working on different phases of different – three or four projects at one time.

Lisa Mighetto: Did that surprise you at the time, or did everyone know that it was . . .

Gerald Joy: No, there was a lot of planning, of course, lead planning, and it was all worked out, and we were simply the design phase of all that planning. And the planning was based on demand and anticipated future demand. And so we not only were designing new powerhouses, we were filling in skeleton units of old powerhouses. Like on the Snake River, Ice Harbor, Lower . . . and Lower Granite all had three skeleton units.

Lisa Mighetto: Skeleton units?

Gerald Joy: Well, they would put in three units complete at a point in time, and put in three units that were half complete, with no generators, just the superstructures.

Lisa Mighetto: Okay.

Gerald Joy: And then, when the demand was there later on, and they had the money, they would come in and put in the generators, and then we had six units.

So we did that at those four projects. We also did that at The Dalles when we put in units 14 through 22.

Ron Leahey: Fifteen through 22.

Gerald Joy: Fifteen through 22. Chief Joe we did the 17 through 27. At Libby, there are

eight. We put in four, then we put in a fifth, and I think now there are still three skeletons at Libby.

Lisa Mighetto: Right now?

Gerald Joy: Right now. At Dworshak we put in two little ones and one big one, and then there's three skeletons there, I think.

Ron Leahey: Yes.

Gerald Joy: I think that is about it.

Ron Leahey: We had done some we had done some projects, that never got built like Libby Re-Regulation Dam, and also McNary Second powerhouse. It was in the planning stage, and then we started doing work on that, and then it got put on the shelf because, like you were saying earlier, the demand for power just wasn't there. And then there are were environmental issues also.

Lisa Mighetto: When did it get put on the shelf?

Ron Leahey: Oh, I'm guessing probably the Libby ReReg job was probably early eighties, and McNary Second powerhouse jobs got put on the shelf in the early eighties.

Gerald Joy: Yes, probably. The other project I didn't mention – one of those skeletons is John Day. I think there are 16 units, and they put in initially, was it 12, Ron?

Ron Leahey: Well, there are 16 right now.

Gerald Joy: Sixteen now.

Ron Leahey: What job, again?

Gerald Joy: I think there's four – maybe it's 20 and there's four skeleton at John Day that are not filled in yet.

Ron Leahey: Right.

Gerald Joy: Is that correct?

Ron Leahey: Right.

Lisa Mighetto: And it was expected that they would be by this time?

Gerald Joy: Well, it all depends on the power demand, and I suppose environmentalists entered in there, too. When they build initially, they have to build for what they think will be the – they can maximize the flow of the river – economically maximize the flow of the river. So you want to put in as many units – provision for as many future units as the river can supply, or can handle. So that apparently was 20, say, for John Day for that size unit, and they put in 16 initially. So they have four more to go, if it's decided to do that. The last I heard, there is no plan to fill those in.

Ron Leahey: I doubt if they will ever get finished.

Lisa Mighetto: Was funding an issue in the early years?

Gerald Joy: I don't think so. Congress put up the money. We had the money. We were going full bore.

... we've got another source of funding in the Northwest ... the Bonneville Power Administration is funding a lot of our work directly now, and that wasn't happening [then]. So the ratepayers now are funding a lot of the work direct from BPA. In the past, it all came through Congress.

We didn't have computers back when I started in 1968. We were using slide rules. We didn't even have the HP-35s and 45s that were the first ones that came out. And when those came out, that was much superior to the slide rule. So you could do calculations much faster and more accurate, and you could do more preliminary calculations....

John Mayer: Didn't we have this real strong Speaker of the House in Washington – Eastern Washington?

Anyway, we had someone – I forget who it was. But anyway, he was giving us plenty of funding, I think, at the time.

Ron Leahey: I want to say Tom Foley.

Gerald Joy: Tom Foley, yes. I think that helped a lot, too. The Northwest got a lot of money during that time. I was just . . .

Lisa Mighetto: Has that changed?

John Mayer: Oh, yes. Now the funding is – well, first of all, it did dry up. It's dried up a lot in the last couple of years. But we've got another source of funding in the Northwest that you'll probably hear from other people, too, that the Bonneville Power Administration is funding a lot of our work directly now, and that wasn't happening [then]. So the ratepayers now are funding a lot of the work direct from BPA. In the past, it all came through Congress. That's only for the Northwest. The rest of the country – I've done a lot of my work on the east coast dams, and we are still getting funding there from Congress, and so there's not very much – you know, the money is really drying up out there right now.

Lisa Mighetto: What are some of the projects on the east coast?

John Mayer: There's quite a few in Southeast Savannah

District, and Mobile District. I believe there's 10 or 11 projects there. They're a lot smaller dams generally than what we have in the Northwest, on the Savannah River, the Chattahoochee River, and a lot of – several of those are on the border between Georgia and Alabama. We do – HDC has done work on those over – I think even in the mid-eighties there was Hartwell Dam, they did some work on there. And then recently – there used to be three design centers, and there was one in Portland, and one in Omaha, and one in Mobile District. Well, when we became a primary design center, all that work shifted to us, and so then we became responsible for what used to be done in Omaha and what used to be done in Mobile.

My group – I mean, where I work right now is out of the Atlantic Branch Division of HDC. We have Atlantic and Central and Pacific, and Atlantic is what I'm familiar with fairly recently, and there I've been working on jobs on those dams, the 11 Mobile and Savannah dams.

Lisa Mighetto: Do you travel for that, or do you do it from here?

John Mayer: We have to travel, but the actual work we can do at our desks. There's a lot more travel. We have to go and make trips to scope out the job ahead of time, and then most of your meetings are going to be there, and you have to meet the project and get information. The new ability to do digital cameras and all, a lot of times now you can get pictures and get answers

by having people out there to look at things for you. But yes, there's a lot of travel.

Lisa Mighetto: You both stay here in this area, right?

Ron Leahey: Yes.

Lisa Mighetto: You're retired.

Gerald Joy: And I worked in the Pacific Branch in my latter years. And that's the Northwest, and so, yes, you pretty much travel throughout the Northwest, and then just before I retired, for a few years, I went to the Central Branch, which is in the central part of the country, and I did a little bit of traveling back there.

Lisa Mighetto: Did you want to say something on that topic?

Gerald Joy: No.

Lisa Mighetto: Are there different issues between - from Atlantic and Pacific, or is it basically the same kind of technologies?

John Mayer: Our powerhouses are designed a little bit differently back there, and the fact that a lot of them have the switchyards actually on the powerhouse, and the Corps of Engineers is responsible for the switchyards.

Out here in the Northwest, generally Bonneville Power owns the switchyards, and so we don't do as much switchyard work here in the Northwest as we do in the other parts of the country. I'm most familiar with the Mobile and Savannah Districts, but there's a lot of -switchyards are

owned by the Corps, and so we have to - when there's upgrades or changes, we do that work, and we hadn't done that work here in the past.

Ron Leahey: We only had one here and that's Bonneville 1st Powerhouse, which has the switchyard on the roof.

Gerald Joy: On the roof.

Ron Leahey: Yes.

Lisa Mighetto: There's a switchyard on the roof?

Ron Leahey: Yes, it's on the roof.

Gerald Joy: And the roof is designed to support the weight of the support structure.

Lisa Mighetto: Is that the second powerhouse?

Ron Leahey: That's the first powerhouse.

Lisa Mighetto: The first powerhouse. Have there been significant changes in technology since you've been here?

Gerald Joy: I'm structural. The computer use is much more now. We didn't have computers back when I started in 1968. We were using slide rules. We didn't even have the HP-35s and 45s that were the first ones - the calculators that came out and . . . you could work with. And when those came out, that was much superior to the slide rule. So you could do calculations much faster and more accurate, and you could

do more preliminary calculations, you know. What if I did this, and what if I did - with the slide rule it was so slow, it took you so long, that you pretty much decided which way you were going to go and that's the way you went.

Lisa Mighetto: And when did that change occur?

Gerald Joy: That was - I'm going to say about 1971 maybe for the HP-35, somewhere in there. And then we got a large computer program, Strudel, now it's CADD. These were programs that the whole office would use and the whole structural section would use, and it allowed much more accurate calculation, and you would get many more values out of the computer.

I designed the take-off tower for Chief Joe, which was a large electrical tower that takes the power from the powerhouse to the - first tower that takes it from the powerhouse and distribute to the land. And at that time, I was using a computer over at Bonneville Power, and all your input was on cards - punch cards, and you'd have a deck maybe three or four inches thick of these punch cards for, you know, to give instruction, and it was very slow and very time consuming. Of course, now you just type it in on your computer at the keyboard, and it's very fast, and much more accurate.

Lisa Mighetto: How do people make that transition from slide rules to computers? Did the Corps have training, or was it just sort of on the job?

It's just like when we went to Computer Aided Drafting (CADD), which was a significant step for us. Before we had to do everything in pen and ink, and then all of a sudden, we're starting to do all the drawings with a computer. There are those people who are reluctant to change.

Ron Leahey: Yes. Some was on the job and some was with classroom training, and some people fought the change to begin with. It's just like when we went to Computer Aided Drafting (CADD), which was a significant step for us. Before we had to do everything in pen and ink, and then all of a sudden, we're starting to do all the drawings with a computer. There are those people who are reluctant to change.

Lisa Mighetto: Did they come around when they saw the advantages?

Ron Leahey: Well, some didn't, but most did. I think there were a few that I remember [who] stuck with the old system until they retired.

Lisa Mighetto: When did HDC get CADD? Well, you've always been in computers, right?

Ron Leahey: Yes. Late eighties, maybe.

John Mayer: I'm just thinking, when I came there was – the computers were at the desks, but I had just gotten there about the late eighties. But I remember they had these more powerful computers that had CADD on them about I'm thinking late eighties.

Lisa Mighetto: So the PCs were there when you arrived.

John Mayer: They were there. They were real slow PCs they had. I don't know if there was e-mail. I don't know . . .

John Mayer: I think there was.

Ron Leahey: Originally you had one PC for two people to begin with. The PC was located between two workstations.

Lisa Mighetto: Can you imagine now doing your work that way?

Ron Leahey: And you had to boot the computer on every time you turned around. No e-mail was available in the beginning.

Lisa Mighetto: Has e-mail changed the way you work?

John Mayer: Yes, I would say so.

Lisa Mighetto: How so? This is John.

John Mayer: Yes, I'd say it's – from when I started working at HDC, any letter – first of all, computers and e-mail, any letter going out of HDC had to be hand-typed on a typewriter. You drafted in hand pretty much, and then you'd give it to the secretary to type it, and it would have to get signed off by four or five people before it would be sent out of HDC.

Nowadays we have gotten to the point where we can – they delegated our responsibilities down a little bit lower to the engineer level, but we don't have to hardly do any of the formal letters anymore. We do a lot of the communication by e-mail to the districts and the projects, and it's really just – you don't

need the secretary to make any letters for you anymore. You can type them out now and just send them. E-mails you get instant communication anyway. You can attach pictures to e-mails. It's really sped things up. It gets more people involved in all the decisions as well.

Gerald Joy: And almost all the engineers now communicate – communicate with the people they need to communicate, you know, to e-mail their letters more regularly than we did back in, say, 1968 when I came. Usually it was your supervisors that did most of the communication with other people, and the engineers were at their desk doing engineering, and didn't do a lot of communication. And part of the reason that it was already touched on was that when you had a letter go out, you would write it out longhand on a piece of paper, hand it to a secretary in the front office, and she'd type it, give it back to you for corrections, you'd give it back to her.

When she got it the way you wanted it, then she would read the letter to another secretary, and then when it went out, it was perfect, and the front office signed off on it and approved it. And, of course, this took a long period of time to do this. So that's why there were a lot fewer people doing the communication. It was usually the upper-level folks that were doing the major communication.

Lisa Mighetto: And so now everybody was involved because – or at least people lower down in the ranks.

Gerald Joy: Yes.

Lisa Mighetto: For the communications.

Gerald Joy: Yes.

Lisa Mighetto: But that means they would spend more time on correspondence than they had in the past, right?

Gerald Joy: Yes, but they'd get their work done faster because they'd get their answers...

Lisa Mighetto: ... technology that was significant that we haven't talked about?

John Mayer: I'll talk about just the dams themselves and the job I was doing. When I first started, we were – my first job was putting computers into the dams for the control of the generators, and we – up to that time we just had switchboards. We didn't have much in the way of computer control. We might have had a controller that was an analog type system, I'd call it, and it would regulate the generation of the generators, just to put a certain amount of megawatts out or in. But now we were adding new computers that were fairly expensive. They were kind of like little mainframes maybe. But we were putting these into the dams to balance the power among the different generating units at the individual dams, and to communicate between the dams, and to communicate back to our power marketing agency, which was BPA.

...when you had a letter go out, you would write it out longhand on a piece of paper, hand it to a secretary in the front office, and she'd type it, give it back to you for corrections, you'd give it back to her.

When she got it the way you wanted it, then she would read the letter to another secretary, and then when it went out...

So that was one big technology change that was just happening, I think, in the early eighties, and it was just going into the dams here. We did that to all the dams. There were other people working on the other dams at that time.

The other big change in technology recently has just been Internet, and that probably started in the mid-nineties, when we started being able to research vendor information, catalogs and all that was available online.

Lisa Mighetto: How did you used to research that?

John Mayer: Well, we had – our distributors would send us catalogs. A lot of times we would just have to call whoever made the product on the phone and wait for them to give us information, if they would send us a catalog or come into the office and give us pricing for different items.

We had a pretty extensive library, and we still do at HDC, but it's not used as much.

Lisa Mighetto: It's right here on this floor, right?

John Mayer: It's right in HDC, yes. But now you can get up-to-date information online very quick. You still have to make phone calls maybe to get pricing now, but anyway, as far as technology, the Internet has made it a lot quicker to research, and you have the reservoir, you know, the whole world as far as getting information on some product, or you'll have vendors in Europe

or everywhere else that make a certain product, and you can get information on that.

Lisa Mighetto: This is an aside: was there a librarian here who oversaw the library?

John Mayer: Someone else will have to answer that.

Ron Leahey: No.

Lisa Mighetto: There wasn't a librarian. Okay.

Ron Leahey: Back in the old days, we had the electrical, mechanical, and the structural sections that had bookshelves out in the main floor, and you kept your catalogs there. The electrical had a file clerk that kind of kept the catalogs up to date and filled. We would get catalog cuts in the mail from the vendors – GE, Westinghouse, etc. and then the file clerk would insert that new material into the binders and so forth, and keep everything up to date. Mechanical and structural sections would do the same thing.

We didn't really have a library like we do now back in the old days.

Gerald Joy: Ron, where are calculations stored now? Are they still up in Seattle?

Ron Leahey: Calculations? We have most of them here.

Gerald Joy: Okay.

Ron Leahey: You're talking about structural, electrical, mechanical engineering calculations for Chief Joe?

Gerald Joy: Um-hmm.

Ron Leahey: We have some here. Well, I don't know if they're all up there or not.

Gerald Joy: What I'm getting at is I think when I retired, at that time all the calculations were in boxes and they were stored in Seattle in a storage facility.

Lisa Mighetto: All of them?

Gerald Joy: All of them for all the projects. Now, back in the old days when we were in the Customs House, from 1979 to maybe 1985 or something, they were in the basement of the Customs House on shelves. So you'd get a phone call from the field saying can we put such and such size transformer on such and such an intake deck? Is the deck strong enough to hold it up?

So back then we just went down in the basement to find the box, find the calculation book, take it up to our desk, and then in two hours that day we'd have an answer for them. Now we tell them we have to get the box from Seattle. So the front office has to order the box, and then it has to take several days to get down here, it was frustrating for the structurals, probably more than for the mechanicals and electricals, because we needed those boxes to look at those comps to give an answer, or to even analyze the structure in a different way. They want to put a certain load on; we have to analyze it. We don't even start to analyze it until we get the old computations and see what was

done then; see what steel was in it, in this concrete structure and so forth.

So in that respect, I think we went backward. When we stored those boxes in Seattle, it was a real backward step.

Lisa Mighetto: And there wasn't talk about putting them online, or were there just too many?

Gerald Joy: No, these are cardboard boxes with ring binders, in them. Say each ring binder has 300 pages of handwritten calculations, structural calculations, and there are boxes and boxes of them. Each project has its own four or five boxes. So it's handwritten stuff. It's nothing that could be put on computers. Even the drawings were done in pencil on my log in the seventies, and now they're taking those and they're scanning them and getting them onto microfilm, electronic process. But that's a big job, too.

But in general we've gone forward, but that was one instance where I think we went backward, when we decided to store those boxes away from Portland, and that was bad.

Lisa Mighetto: And now you have to call them up every time you want them.

Gerald Joy: I don't know if it's still that way, but that's the way it was, I think, when I left.

Ron Leahey: As far as electrical goes, we got a fair amount of electrical calculations

here in the office in our files, like fault studies and load studies and things of that nature. And some got tossed out when we moved from Customs House over to RDP because we just didn't have room here. There are copies of these drawings at the projects and district offices.

Lisa Mighetto: Was that regretted later, or you didn't need them?

Ron Leahey: Well, sometimes it's regretted later that we didn't hang onto a lot of that material.

Gerald Joy: The most important stuff is the boxes of calculations. We did some of that, too, Ron. Some of the large drawings on stick files. They can be replaced. You can get that information some way. But the calculations, we never throw those away, even on Bonneville, which was built in, what, 1938. The year I retired, I had boxes of Bonneville calculations that I was looking at, because they were doing a rewind on units 1 through 10, and they always wanted to put heavy loads on the generator floor in different locations. And so we would have to get those boxes down from Seattle and investigate that generator floor to see if they could take new loads, and tell them where they can put their supports for the new loads, like that, or something like that.

Lisa Mighetto: So that came from Seattle.

Gerald Joy: That came from Seattle.

Lisa Mighetto: And this is Jerry. So they have records going back to the thirties, then.

Gerald Joy: Yes.

Lisa Mighetto: Have security issues changed the way you work on your areas? I thought of that when you were talking about the computers at dams.

Gerald Joy: Yes, the security issues have changed at the dams as well as in our offices. But at the dams we have to be real secure about outside connections to our other computers that control the dams. And we've always been aware of that. It's only in recent years when some of the operators at the dams may want to connect up for Internet access or the local area networks for the projects that we have to be more concerned. Generally there we don't connect into the networks for our controls over powerhouses, so we really keep it separate.

In our offices, yes, we've had a lot of security. Back at the Customs House we used to be able to - I don't think there were even security guards. At least not in the evening. You could get in there, most times the public could get in there. Now look at this building, there's security guards at all times. The building is locked.

Back in the Customs House days, I know there was a lot less security. I believe back prior to that other people can talk about it. I think we were in a Federal Reserve building and there [were] probably guards in that building.

Ron Leahey: Well, yes, the Federal Reserve Bank, you had a guard there, but you didn't have to show a pass or anything. Just walk in and out.

But as far as security to the powerhouses or the projects, they're starting to install elaborate security systems.

Lisa Mighetto: After 9/11?

Ron Leahey: After 9/11, security was a big issue on how to protect the projects. So it's all changing.

Lisa Mighetto: And you retired after 9/11, right? Or were you gone by then?

Gerald Joy: No. I retired January 3rd of 2002.

Lisa Mighetto: The next year.

Gerald Joy: And that's when they got the guards here in this building, down on the third floor.

And they started checking everybody in and out. It got real serious after 9/11. Prior to that it wasn't too bad.

Lisa Mighetto: But it sounds like it didn't affect your job, though, right?

Gerald Joy: As far as coming in here and doing your job, no.

Lisa Mighetto: Or what you have to address in your job. It sounds like it didn't.

Gerald Joy: No.

Lisa Mighetto: Well, is there anything that we haven't talked about in terms of significant development? You did mention staff reductions, Jerry, earlier.

Gerald Joy: Well, that was because of workload. The staff reduction was because of the workload. I think now we have about 80 people maybe.

Ron Leahey: About approximately 85 employees now.

Lisa Mighetto: So down from 125 to 85?

Ron Leahey: Yes.

At one time it was down to sixty-some people.

Lisa Mighetto: When was that?

Ron Leahey: I think that would have been in the late eighties, early nineties.

About that time because I know we were going to RIF a few people.

John Mayer: Right, and that was after I started. But it was several years after that.

Yes, it was like sixty - I want to say somewhere between 65 and 68 people, somewhere in there, that we were down at one time.

Lisa Mighetto: And what accounted for that in the eighties? Drop in demand?

Gerald Joy: Budget. Budget constraints, I think. That

was probably in the Reagan Administration.

Gerald Joy: Well, a lot of powerhouses were built, and skeleton units were put in. Most of that happened in the seventies and early eighties. I would say by mid-eighties most of the skeleton units were going to be filled, and most of the powerhouses that were going to be built were built.

Lisa Mighetto: So the work was done.

Gerald Joy: So the work was done in the Northwest. And from there on it kept tapering off.

Lisa Mighetto: From the eighties through...

Gerald Joy: Yes, the work kept tapering off, and your ability to get the work done kept increasing because you had computers, e-mail, and you were more efficient. You had CADD, you needed [fewer] draftspersons. So you got more efficient and the workload is dropping off, and so you had to let people go. It wasn't that they weren't performing. You just didn't have the work for them.

Lisa Mighetto: And then another 20 were added later, then. What happened there, if you're back up to 85?

Ron Leahey: Yes, as we started doing more rehab work, replacing outdated equipment...

And we were made a center of expertise for the whole nation, which brought in more work for

this office. So we kind of built up our staff.

John Mayer: We've also been trying to build up staff because of retirements coming. We've hired a lot of new engineers in the last four or five years. There's a lot of what we call engineers in training. They come in through the training program and they spend about 18 months in training, and then they become part of HDC, working here.

Lisa Mighetto: Can you describe that training program?

John Mayer: Well, I can give a little bit of the basics of it, but generally we hire new engineers and it's called a training program, and they don't really work at HDC itself during a whole lot of that time, during those 18 months. They work at a project for maybe a month or six weeks, and they work in maybe Seattle District or Walla Walla District. They work in a different district for a month, and they work in several different projects. They work in Portland District in different offices, and at the end of that time, the way I understand it, they have a choice of where they want to work in the Corps of Engineers, and it doesn't have to be HDC. But generally we have been getting them. They come and stay at HDC.

But that's how our training program has worked for the last - we've had this EIT program, I think, ever since I've been here. It's just that we've had a lot of new engineers in the last several

years because there are a lot of retirements.

Lisa Mighetto: Is there concern that there are so many retirements coming?

John Mayer: Oh, yes, there's a lot of concern with that, and they have been trying to capture that information out of the people retiring. I don't know if it's being done well enough as it should, but there are a lot of people retiring, and some people have come back to work after they're retired on a contract basis for different jobs. But there have been a huge amount of retirements in the last four or five years.

Gerald Joy: You have a celebrity in your midst. Ron is the oldest HDC employee still working, who goes back the farthest. What did you say, 1966, when he was at HEDB, and here we're in 2004, he's the oldest guy still in the organization. Isn't that right?

Ron Leahey: That's right. And it's unusual because I've been working for the same agency, at the same office for almost 39 years. That doesn't happen anymore, you know. Those days, I think, are gone. People (new) tend to move around more.

In the structural section we had quite a little nucleus of loyal employees. Dave Raisanen came about your time, and then Don Fechner came, and then I came in 1968, then Madden came in about 1970, Del Kester slightly after that, and we all stayed with HDC, HEDB for our total careers.

We've also been trying to build up staff because of retirements coming. We've hired a lot of new engineers in the last four or five years. There's a lot of what we call engineers in training. They come in through the training program and they spend about eighteen months in training, and then they become part of HDC, working here.

The old folks know all of the projects. They worked on all of them, and they know where all the boxes are to look for the drawings. They can give you more information in five minutes than maybe the rest of the office could give you in a week because they've been there.

And I retired in 2002, I think Dan Madden retired at about that point also, and we were the last two original structural section folks to go. So now there are no original structurals left, and just a few like Ron, who support the others.

Lisa Mighetto: Can you see this as distinctive within the Portland District and the Corps – that is, . . . that people tended to stay at HEDB?

Gerald Joy: It was a good place to work.

Lisa Mighetto: What made it such a good place to work?

Ron Leahey: Oh, I think the people, the organization, the camaraderie. . . . And it was interesting and challenging work. I have no regrets, you know. I've always enjoyed working here. I must have. I stuck with it long enough, you know.

Lisa Mighetto: What are you going to miss when you retire?

Ron Leahey: I will miss the people and the work also.

Lisa Mighetto: What won't you miss?

Ron Leahey: Getting up in the morning! How about you, Jerry? Do you enjoy retirement?

Lisa Mighetto: It's been two years now, right?

Gerald Joy: Yes, I do enjoy it. I have done a little bit of AE work for the Corps the first two years after I retired, but I have

a small farm, 13 acres, I have a dozen head of cows and a bull, and I raise some calves and maintain my farm. I do a little bit of engineering, and I live a more relaxed life. I don't regret having to drive in the morning and the drive at night. Just before I retired, bus fares were free, so I came in on the bus. The government paid for your bus fair. So I came in on the bus, and that was not – that was not fun.

Lisa Mighetto: Is there anything you miss?

Gerald Joy: Yes, the people. Today is fun, coming back and seeing the folks, and talking. I do miss that, and I'll probably stop in at the front office as I go out and talk to the chief, and see if there is any work out there because I wouldn't mind continuing to do a little bit of AE work.

Lisa Mighetto: As a contractor?

Gerald Joy: As a contractor, and that keeps me associated with the folks here. That's fun.

Lisa Mighetto: Did you want to say anything about what keeps you here?

Gerald Joy: I've enjoyed working here, too, and I think it was – before we moved over to the Portland District Building here in the Robert Duncan Plaza, I thought there was a lot more maybe camaraderie over there in the old building because we were really part of the division, but we were a lot smaller group, and now we've been integrated

into Portland District, and we use their cafeteria. I mean, we're actually part of the Portland District. Back then, we were kind of set off by ourselves, and I thought we were more autonomous and . . .

Lisa Mighetto: It's a smaller building, right? I mean, fewer people work there.

Gerald Joy: Yes, that was a smaller building. It was an old classic building. We'd have the company picnic – or the division picnic I should call it, and we have that picnic separate now. There's a Portland District picnic every summer. It's a lot bigger organization. But it was a kind of a different atmosphere over there at the Customs House is what I remember.

Gerald Joy: To me, the closeness isn't present in this time and age like it was 10, 15 years ago, where everybody you knew, you know, was still there, you know, like in the bank building, Customs House. You had nice Christmas parties and gatherings and so forth. Now, all the older people, they're gone, retired, with the exception of myself, and it's like coming in and you don't know anybody here anymore. It's like 50 percent of the people are new.

Lisa Mighetto: So that continuity is lost.

Ron Leahey: Yes, exactly. Like when I come to work now, why, it's kind of an empty feeling. It doesn't have anything to do with your job, but it just is you really don't know anybody like

you did before. So many people you used to work with and were close to are now retired.

Lisa Mighetto: Do you mentor people?

Ron Leahey: Yes, I have.

Gerald Joy: I'd say Ron is a go-to guy. We go to him if we have questions on electrical. That's how we'll miss Ron and other people as they retire.

Ron Leahey: It's getting close for me here.

Lisa Mighetto: When will you retire?

Ron Leahey: Well, I'm thinking next spring.

Gerald Joy: And that will be a real loss. The old folks know all of the projects. They worked on all of them, and they know – if they didn't work on a particular item, they know that Joe Blow did, and they know where all the boxes are to go look, where the drawings are to go look. They can give you more information in five minutes than maybe the rest of the office could give you in a week because they've been there. And so when you lose everybody, like the structural section now has lost everybody, I think it's a real loss to HDC.

Lisa Mighetto: You don't have that resource to go to.

Gerald Joy: No.

Lisa Mighetto: Is there anything that you would like

to add that we haven't covered about significant development?

Gerald Joy: Thank God for technology. It's much easier today than it used to be.

Lisa Mighetto: And you see that as a very positive thing, but you were mentioning it – Ron was mentioning earlier the tension that that can create when people have to adapt to that. But would you say HDC's been adaptable generally?

Gerald Joy: Sure.

Gerald Joy: We talked about going from slide rules to computers, and was that difficult? No, that wasn't difficult; that part of it. Because once you got this little calculator, it doesn't take you very long to learn how to use it. The only difficult part that I remember was we used – most engineers use HP, Hewlett-Packard, they're from Texas, because HP is the only one that has the . . . notation, where it has four storage registers that you can draw up with fewer keypunches. And it's like having four storage registers, but you don't have to identify them to pull them up. You just go right to them.

And so you had to, in your head, learn what was in each of those four as you're doing your calculations. But once you taught that, boy, that was super.

Lisa Mighetto: It just made things easier.

Gerald Joy: Yes, that HP-35, HP-45, those were wonderful,

I think in the past the engineers didn't do their own drafting. They had CADD folks do that. I remember when they had drafts people do their drafting, back when it was pencil and paper. Now, the engineers generally have learned how to run the CADD programs, and a lot of us, including me, we do our own CADD work and make our own drawings on the computer.

and we never looked back from there on.

Lisa Mighetto: I think it was the transition to CADD that you mentioned, Ron, was the hard thing.

Ron Leahey: There were some people that had a little problem with that in the beginning. The old-timers that worked here for a long time were doing the old pen-and-ink drafting and next they're going to learn CADD on computers. This was a very difficult transition for many.

Gerald Joy: Some people, you know, they're not oriented in that way. When they started with pencil and Mylar, you know, that's what they know. And now, you're going to take them and jerk them away from that and immediately put them on a computer or typewriter or something they don't know and is not their forte, then . . .

Lisa Mighetto: It's a hard transition.

Gerald Joy: . . . it's a hard transition. I'll take my older brother as an example. He worked for the Forest Service, and he was a reforestation person. And the moment they pulled him in the office and made him do environmental impact statements, which means he had to type stuff up, he quit. He gave up his 20 years or whatever he had in and he left. He couldn't take that new technology. He couldn't take that new job. It was stressful to him, so he quit. And that's what Ron was saying about some of the

CADD folks. They were resistant to make the change.

Lisa Mighetto: But would you say overall that the staff at HDC embraced technological changes?

Gerald Joy: Oh, sure. Yes.

John Mayer: Yes. Even when other changes - I think in the past the engineers didn't do their own drafting. They had CADD folks do that. I remember when they had drafts people do their drafting, back when it was pencil and paper. Now, the engineers generally have learned how to run the CADD programs, and a lot of us, including me, we do our own CADD work and make our own drawings on the computer.

Lisa Mighetto: Does that mean the draftspeople are out of a job?

John Mayer: Well, for some people - some engineers don't do CADD work and so we still use draftspeople for that work. But there's a lot less need for draftspeople than there was, and so there's - and it's made it more efficient, though, for engineers when you can do your own drafting work, a lot of it, depending on the type of work you're doing. But if you can do your own CADD work, you can avoid going back and forth.

It's similar to, like, having a secretary type up your letters. You don't have to write it down and have it go back and forth to correct it and all. You can just go right to the word processor now and type a letter, or type an e-

mail. Same with CADD. It's much more efficient nowadays.

Lisa Mighetto: Did it make people more independent, the engineers?

John Mayer: Yes, I think it does make them more independent, the engineers, as far as doing all the work yourself, although I guess one other thing is we do work in teams now, more than we used to in the past. So we're working in teams with other engineers, and we have different disciplines, and electrical and mechanicals may work together on a team. So there, we're not as independent as we – it depends on the job, though. Sometimes you're independent, depending on the type of work you do.

Lisa Mighetto: But it sounds like you might be more integrated with – well, if you're working on teams, then in other areas, right?

John Mayer: Yes. That is one of the changes. I mean, you asked about change, and we didn't dwell on this much, but the Corps of Engineers is getting more into the working of teams now, and we work with some of the people in the Corps of Engineers.

HDC has another office, a small office in Mobile, Alabama, that consists of about, I guess, three or four people right now, and we have some jobs where we have them and us working on the same jobs, and we – it's really considered part of a team.

Lisa Mighetto: How does that work with the long distance?

John Mayer: Generally, you have meetings occasionally, but maybe only once every three or four months, depending on the type of work you're doing. But with e-mail and telephone and we're on a network, in a local area network where people in Alabama and here can both call up the same drawings off of our Portland District network here, we can all look at the same drawings, so it's really not much difficulty there. Just mainly, it's e-mail and the telephones. We can work on the same projects and not have any problem.

Lisa Mighetto: Is there anything that you would like to add? Well, thank you all very much.



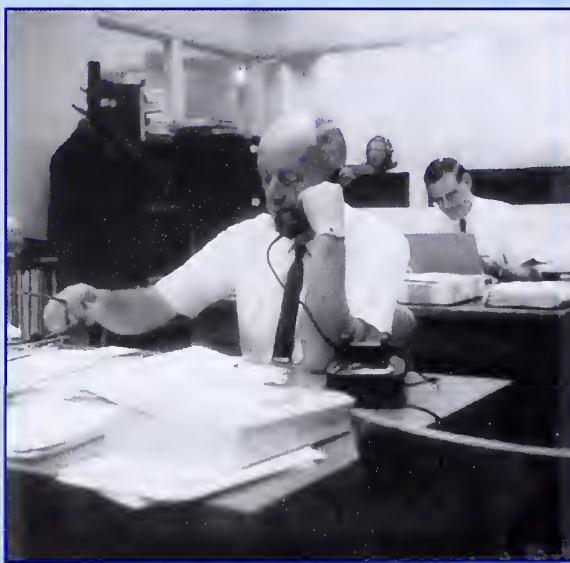
Trev Price, Jose Corpuz, John Noble, Ken Laumand, Ove Carstensen, and Gerald Joy.



Ray Schmitz, Ron Leahey, and Mike Spence.



Joe Swyers, Vic Polich, and Orval Burton



Chet Scott and Bob Kinsel.

Atlantic Branch



Atlantic Branch staff include (back row, from left) April Hale, Bob Schofield, Steve Maness, John Fahrer, Paul Willis, Duke Loney, Doug Filer, David Samson and John Jones; (seated, from left) Phil Davis, Dan Madden, John Mayer, Jim Norlin, Rick Vanatta and Ron Cleys. (Not pictured are Rudy Hernandez, Al Lewey, Linda Tompkins and Nathan Stevens.)



HYDRO
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INTERVIEW
5

Interviewee: Bruce Bayley

By Lisa Mighetto
November 18, 2004
Portland, Oregon

Lisa Mighetto: Bruce, why don't we start out by having you talk a little bit about your background? How did you come to work for HDC?

Bruce Bayley: How far back do you want me to go? I started out in the Walla Walla District. I live in Walla Walla, and –

Lisa Mighetto: Are you from eastern Washington?

Bruce Bayley: Yes, basically. I've lived a lot of places, but that's where everything starts. We moved there in my junior year in high school, and I got to know guys at high school whose fathers worked for the Corps, and so I decided to go into civil engineering, because the Walla Walla District was really booming at that time.

Lisa Mighetto: When was this?

Bruce Bayley: That would have been – I moved there in '55. I graduated in '57 from high school, went to Washington State, took civil engineering. After my freshman year I went on as a student trainee out at Walla Walla District.

Lisa Mighetto: What did you do at the training?

Bruce Bayley: I was drafting, and then in the second summer it was plotting cross sections in civil work, and computing quantities. As a student trainee we were just put on leave without pay and I got full time for it. Friends later were jealous of all the extra time I got in.

Then when I finished college and I went on the rotational training program.

Lisa Mighetto: So this was still in the fifties.

Bruce Bayley: I graduated in '62 actually, and I started rotational assignments and then did work one assignment in HEDB, and they were all wearing suits and ties then, or sports coats and slacks and ties. And I thought I'd never work in this office, and live in the city.

But I went to work originally at – after the training program I went to work at John Day Dam, lived in The Dalles. That's where I met my wife. She was born and raised there, and her family went clear back

to homesteading in The Dalles, and I don't know why she went with me because the Corps of Engineers drowned Celilo Falls, and that was big deal. But we ended up getting married and I came back to Walla Walla District from there with a promotion in structural design.

We had a big RIF (Reduction in Force). I think that would have been like '71 in the Walla Walla District, and we, of course, had a lot of opportunity to go out in the field. I went to Lower Granite then. When Lower Granite started winding down, which would have been like '74, I put in for a bunch of jobs. I even tried to get on the pipeline. But then the Corps got out of the pipelines, Alaska Pipeline, and so I finally got a call from Mel Setvin from HEDB offering me the job.

That was one of the jobs I had put in for, so I was heading for HEDB, and I'd be wearing suits and ties, and taking the bus to work.

Lisa Mighetto: In Portland, right?

Bruce Bayley: Yes – a whole new way of life because I was pretty rural, and especially working out on projects.

Lisa Mighetto: Did you like working in Portland?

Bruce Bayley: Yes, it was a complete change, you know, completely new, and I found out right away – at that point they weren't wearing their suits and ties anymore.

Lisa Mighetto: In the seventies.

Bruce Bayley: Yes, '74. I walked into work on February 12, 1974. My family came into Portland later on.

Lisa Mighetto: Were you in the Customs House then?

Bruce Bayley: No, we were in the Federal Reserve Bank building, and we were on the third floor, and it was one big, open floor, and you had to go through security every day, but we didn't have to wear badges or anything. But, of course, we were in the bank. And I think we were there for probably five years. I think we moved there in '79 to the Customs House.

Lisa Mighetto: What was your position there when you started?

Bruce Bayley: I came in as a GS-11, structural engineer working for John Oda. Mel Setvin was the Structural Chief, and then John Oda. Mel Setvin would have been a 14, I think, and Oda would have been under him. He was my direct supervisor.

We were working on Chief Joseph Dam, and then a little later on Bonneville 2nd Powerhouse, these were big projects, and we didn't have computers then. We used slide rules. I think we were using slide rules, still are using slide rules, and calculators didn't hold juice very long . . .

Lisa Mighetto: When did you get computers?

Bruce Bayley: I think it wasn't until we got to the Customs House that we had our own personal computers. When we first got to the Customs House, we had one computer that served several engineers, so you had to kind of wait your turn to use it.

Lisa Mighetto: A PC.

Bruce Bayley: No, a terminal connected with Boeing. They had the big computer system, and we didn't get into each person having a PC until probably the late eighties, I would guess.

Lisa Mighetto: How did that transition from slide rule to computers go?

Bruce Bayley: Some guys adapted quickly. I tend to hold on to the old ways until you're just forced to get out of it, you know. And I was really slow to pick up on it.

I remember Dick Willy was our main computer guy in the reserve bank, and we had, I think, one computer we sat down at. Actually it was just a computer terminal.

Lisa Mighetto: For training?

Bruce Bayley: No, for work. Prior to it, we used a computer in the Custom House.

We filled out forms from which operators then made punch cards and fed into the computer. There would be hundreds of cards for a "stability job" and one wrong punch would

bungle the whole run. We would spend hours looking for the bad punch.

Lisa Mighetto: Did they train you on the computer? How did you learn to use it?

Bruce Bayley: Yes, I learned to use it under Dick Willy's instruction on what we were doing at the time.

I think I would have been better off just doing it by hand, you know. I can think back about that and I wasted so much time going through boxes of punch cards. It was pretty terrible.

Lisa Mighetto: But by the late eighties you each had your own computer.

Bruce Bayley: Yes.

Lisa Mighetto: No more punch cards.

Bruce Bayley: Right. And then it was very slow to adapt. I'd like to write all my drafts on paper, because I'm just used to doing that, and then I typed it up, typed from the paper into the computer. But then I found that I could compose much better using the computer. I don't know why I was so slow to pick that up, but it's just new stuff, and some guys like Dave Raisanen – he was my boss there in the Customs House. He was the Structural Chief then. And he'd just pick up on it very quickly.

But slowly I got good with it. And then we had very powerful software for design – for analysis

and design software. It was really fun.

Lisa Mighetto: What was the software?

Bruce Bayley: It was called Strudel and STAAD, Structural Analysis and Design, that was the name of the software, so you could put in models of the structure you were doing, and it would tell you the stresses, and you designed using that software. You'd still have to know what you're doing. You make wrong assumptions, and if you put bad results in, you get bad results out.

Lisa Mighetto: Garbage in, garbage out.

Bruce Bayley: Garbage in, garbage out. That was definitely true.

Lisa Mighetto: Were there other technological changes that you remember?

Bruce Bayley: Well, of course, that was huge.

Lisa Mighetto: Going to computers?

Bruce Bayley: Yes.

Lisa Mighetto: How about AutoCADD?

Bruce Bayley: Now that's another – I enjoyed drafting. I enjoyed doing my designing and laying my design out on a draftsman table, and we had technicians that – I mean, the final product had to be on this computer-aided drafting and

We had a terminal connected with Boeing. They had the big computer system, and we didn't get into each person having a PC until probably the late eighties....

design – CADD system, and all the drawings went out on that. But they would get my stuff from vellum off of the drafting board, and for most of the engineers, or all of the engineers for a while, and then some of the engineers started using CADD, and then they put pressure on you to learn CADD.

Lisa Mighetto: Did they offer training?

Bruce Bayley: They did for the technicians, and OJT [on-the-job-training] mostly, I think. But I never took a course in computer-aided drafting. Now, I mean, you can reflect back on it, and I would have definitely spent more and done that, you know, because it would have really helped.

I got into small hydro design. I was structural, and then I went to work for Ken Laumand. I got promoted to a GS-12 and to small hydro.

Lisa Mighetto: What were some of the small hydro projects you worked on?

Bruce Bayley: We were the design center, you know, and we were doing small hydro projects for all the other districts within the Corps, so all over Alaska and Tennessee. But you could do layouts and CADD would have been really good because you could make changes real quickly and move turbines around and floors around because there would be suggestions. What you did, you worked for a steady manager like in Tennessee, in Nashville, and then he'd get

all the groundwork for it, work with him, and then you would do some sketching. I worked with water management, for Orv Bruton, quite a bit in water management, and they'd come up with how much megawatts they could get out of what was there, and then you go through the turbine section and get those sized, and then do a layout and get input from all the rest of HDC sections, and come up with a design.

But they'd have suggestions, and like Brian Moentinch, he'd say why don't you do this, and why don't you do that. Well, then you'd have to redraw it out again, and if you had CADD, why, you would have been – and I regret – that's one of the regrets I have, that I didn't really get into it. That would have been more flexible, because that's the power of a computer – quick changes without having to redraw the whole thing. And the same thing with word processing. I had paper wads and all – I went through lots of paper, and my hand would get tired from writing and then rewriting and rewriting.

Lisa Mighetto: It's an amazing thing.

Bruce Bayley: Yes, and it's funny – I mean, you'd think you could reduce the number of people, but I think you should come out with still a lot of people, but – well, we reduced in size, but you'd think with a computer you would get done with one-fourth the work force or something. But I think you come out with a lot

better product because you're not fixed on it. You don't get fixed and set on something, because it takes too much time to go back and redo it all the time. You just don't have that kind of time, but with the computer you can, you know.

That's what I can reflect back on, and realize the power of that, you know.

Lisa Mighetto: How did you like working on small hydros as opposed to – did you say you were working on the Bonneville second powerhouse?

Bruce Bayley: Yes – well, that was a huge change. We went from a design branch to a center of expertise. And there were no more big projects, you know. There were just small ones, adding hydropower to existing projects, and then the designers in the structural section were designing small plants then. We just went from doing big projects like Bonneville 2 and Chief Joseph 2, where you're adding huge powerhouses. So yes, we then went to small projects.

Then that went away because it started going to non-federal people, and then we lost that, and it just went away. And I ended up back in structural, doing structural work again.

Oh, and then the other thing that was huge was that a lot of our design was doing fish screens, the long screens and stuff, and it got to the point where we weren't even doing much. We were doing some

dam modification – powerhouse modification work, but a lot of it was for the fish, on the fish screens.

Lisa Mighetto: Would this have been the nineties by this time?

Bruce Bayley: Yes. '88 to '95, was pretty much how I finished up.

Lisa Mighetto: And that's when you –

Bruce Bayley: The small hydro was gone. Yes.

Lisa Mighetto: Did you like working on fish facilities?

Bruce Bayley: Oh, Don Fechner was a genius. He came up with a fantastic innovation for supporting those fish screens and the operation of them, and the mechanicals; their mouths dropped open because they felt they knew how to do all that stuff, and when Fechner came up with making them for the whole thing, I don't have a real clear idea, but now I haven't thought about it for a long time, but it was just getting those long fish screen supported and in position so they'd move.

Lisa Mighetto: Did you work for the biologists?

Bruce Bayley: Oh, yes. Yes. They set guidelines for it, and then came up with ideas. We figured the fingerlings were getting under the screens, we're talking about downstream migrants, and they were getting

underneath the short fish screens that were put down on the bulkhead slots in the powerhouse. And, then, they would come against the screen and then they would go up and into a channel, and then come out down in the tailrace in a shoot, you know.

Lisa Mighetto: Did you ever think when you started that you'd finish up your career working on fish facilities?

Bruce Bayley: You just don't know how it's going to go.

Lisa Mighetto: So you retired in 1995.

Bruce Bayley: Yes.

Lisa Mighetto: Did you continue to work as a contractor?

Bruce Bayley: No, I pretty well was done. I never did any more except design foundation walls for friends and stuff, you know, retaining walls and stuff, but that was all. I had a professional engineer license, so I could stamp drawings, and do work for people. I did a little of that, but for the most part I was through.

Lisa Mighetto: So did you continue to live in the Portland area?

Bruce Bayley: I live in the same house that we moved into in '74.

Lisa Mighetto: So were you in the Pacific Branch?

Oh, Don Fechner was a genius. He came up with a fantastic innovation for supporting those fish screens and the operation of them, and the mechanicals; their mouths dropped open because they felt they knew how to do all that stuff....

Bruce Bayley: They didn't have the new branches then. I brought this chart. This was the breakdown then. You can see there was electrical, and mechanical, and structural, just three main branches.

Lisa Mighetto: And you were in structural.

Bruce Bayley: Yes. And these are my old cohorts (has pictures). They're all retired now. Well, Jan Leader is still here, as far as I know. The last of them retired about two years ago.

Lisa Mighetto: So you worked on projects - it sounds like not only in the Northwest, but you mentioned Tennessee.

Bruce Bayley: That's when you're in small hydro, but I was still in the structural and we had a structural chief. Dave Raisanen was our Structural Chief, and my immediate supervisor was Ken Laumond. He's the one that hired me. You know, the supervisor is the one that actually makes the final pick. And I worked for him until he retired, and then we didn't have those two subsections anymore. We had powerhouse design subsection; that was the small hydro, and the structural subsection. Raisanen was the supervisor, Structural Chief, and then those two subsections were dissolved and we just had one structural, and that was run by Dave Raisanen. He took over for Lou - Lou Murzchwich died. He died of cancer. And so we were just one - and then when Dave Raisanen retired, the whole setup changed. They went to Pacific,

Atlantic, wherever, you know, because they didn't replace Dave Raisanen. So that was the end of an era right there with the retirement of Dave Raisanen.

Lisa Mighetto: And this would have been the early nineties, around '93?

Bruce Bayley: No, it would have been after I left, because Raisanen retired the following year, so it would have been '96 that that happened, that this was completely re-jumbled. And then they were still in the Customs House for, I don't know, another couple of years before they actually moved over.

Lisa Mighetto: But you never worked in this building.

Bruce Bayley: No, a lot of guys didn't like the idea -I mean, we had prestige of being a design center and we didn't want to be connected with the district, and a lot of guys resented that; I don't know if that's casting a bad light, but a lot of guys resented that.

The attitude is more technical in HDC than it was. When we moved over here, I think they had A/E contracts and stuff, and kind of ran A/E contracts. The guys that I worked with liked to do their own design, you know. They didn't want to do A/E contracts, and we were more technically bent. We didn't like doing administrative work. So there was some attitude change.

Lisa Mighetto: Is that why you retired, or that had nothing to do with it?

Bruce Bayley: No, I enjoyed my work. I wanted to stay on but Dave said, "There's not going to be enough work in the future, so you might as well retire. He recommended I retire. So I did. I stayed a year longer than I needed to. We were really busy, and then the work just started diminishing, and I figured it was time to go.

Lisa Mighetto: Why was the work diminishing?

Bruce Bayley: Well, we didn't have the big projects; we didn't have the small hydro projects. All we had was fish stuff, and times were changing.

Lisa Mighetto: Is there anything you miss about it now? It's been almost -

Bruce Bayley: It's funny; I really haven't missed it. I think back now, and I have a tendency to think, "well, I could have done it better, you know, because like I've told you about the computers and stuff, and CADD, and I felt that I was a pretty good coordinator." So I find joy in that, and I really learned a lot there. I toured a lot with that job. Instead of being just down doing technical work all the time, and going around coordinating and talking to these guys, I finally started getting a way about me, you know, so I felt that it was a big positive thing for me and my career.

Lisa Mighetto: Did you travel a lot to the projects?

Bruce Bayley: No, I didn't. I could have done more. Some of the guys went out a lot more than I did.

Lisa Mighetto: Have you stayed in contact with some of the people you worked with?

Bruce Bayley: Yes. I have - well, Dan Madden. He was there when I came, too, but he was a young engineer. I had 15 years in by the time I came here, because I retired with 36 years.

Lisa Mighetto: Really?

Bruce Bayley: Because I got those four years while I was going to school, and so my effective date goes back into the fifties, but I can't remember just what it is. It's 36 years, though, and from '95 - it must have been '59 effective date.

Lisa Mighetto: So from then all the way to '95.

Bruce Bayley: Yes, 36 years. So we would get together with Dan and his wife, Jan. They live in Vancouver now.

Lisa Mighetto: Are there any formal get-togethers?

Bruce Bayley: Yes. Our whole gang, mostly the structurals would get together one or two times a year. Somebody will coordinate it. Sharon Demeaux, she's in structural now. She wouldn't be on this list for interviews, she's too new to HDC. Varis Ratinicks and Sharon coordinate the get-togethers, but

since Varis retired, we haven't had too many.

Lisa Mighetto: So there was a woman engineer?

Bruce Bayley: Yes, but not when I was still here, she came to work afterward.

Lisa Mighetto: Was it a close-knit group while you were working here?

Bruce Bayley: Yes, I think so. Yes, we had our own little jealousies of each other. We all felt like we were the best technical person. There was a lot of differences, there was that, but generally we were all good friends and then we played ball together. We had a ball team, the "Liniment League," and so that really pulled us all together.

Lisa Mighetto: Baseball?

Bruce Bayley: Softball - a slow pitch. And the Corps had ten or eleven teams at one time, years ago.

Lisa Mighetto: Whom did you play? Each other in the Corps?

Bruce Bayley: Yes. We'd play structural from the district office, and that was a big rivalry. We'd play other NPD offices (North Pacific Division), outside of HEDB. We didn't think of ourselves as part of the NPD teams. We had other NPD teams, and they were some of our biggest rivalries.

Lisa Mighetto: You thought of yourself as a separate entity.

Bruce Bayley: Yes. We were the design center. No, we were pretty jealous of that - pretty proud of that, you know. And our chief, Glenn Meloy, was really pushing it. He's the one that really pushed to establish us as the "design center of expertise" - that was the political part of it.

Lisa Mighetto: Well, is there anything that you would like to add about your time here, or major developments?

Bruce Bayley: I guess I got it pretty good.

Lisa Mighetto: Well, thank you very much.

Bruce Bayley: Yes.



Bob Dichtel, Mel Taylor, Art Wilcox, and Wally McMannis/



Charles Horner, Mike Broun, Russ Smith, and Tommy Toyota, seated.



Roland Ott, Wally McMannis, Alf Swanson and Larry Arneson, seated.



Larry Jacobs, Mike Broun, Jim Mooney, and John Jones, seated.





HYDRO
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INTERVIEW
6

Interviewees: Larry Jacobs, Jim Kerr, Jim Norlin

By Lisa Mighetto
November 18, 2004
Portland, Oregon

Lisa Mighetto: This is the HDC interview, Portland, Oregon, November 18, 2004. I suggest we start out by having both of you introduce yourselves briefly, talk about how you came to work for HDC, when you came to work for HDC, and what you do there.

Larry Jacobs: Okay, Larry Jacobs. I came to work for HEDB/HDC in 1969. That was a method to get out of Detroit, Michigan, with too much smog. I wanted to go west. Then the job offer opened here in the days of no interviews. I sent my little form in, they said yes – a body, I guess, and offered me the job.

Lisa Mighetto: What were you doing?

Larry Jacobs: I was working in Detroit at the Army Tank Automotive Command designing wheeled and tracked vehicles for the Army.

I talked to somebody out here over the phone to find out what the office did, so I had some idea of what I was stepping into. But the big thing was to go west and move out of Detroit, Michigan.

Lisa Mighetto: And what did you do here?

Larry Jacobs: Here, I came in the first few years as – I did a lot of crane work, crane design, checking crane drawings. They were finishing a number of the projects on the Columbia and Snake rivers, so I was mainly in the machinery end of it.

I progressed into head of the machine design group. Anything mechanical, cranes, fish screens, elevators, and miscellaneous equipment. And then in later years, about 1991, I guess it was, I took over as head of the Mechanical Branch, and then when we reorganized, became head of the Central Branch, and then retired and turned Central Branch over to this gentleman.

Lisa Mighetto: When did you retire?

Larry Jacobs: In 2001, I think.

Jim Kerr: January 2nd.

Lisa Mighetto: You remember.

Jim Kerr: Jim Kerr, currently the chief of the Central Branch, HDC. I started on May 12, 1980. The retirement date is August 4, 2011, in case you would like to know.

Lisa Mighetto: How did you come to work for HDC in 1980?

Jim Kerr: I came out of school, University of Portland. I had job offers from Boeing, from Hewlett-Packard, from Portland District, and from HEDB at the time, so I had two Corps offers.

Lisa Mighetto: Why did you pick this one?

Jim Kerr: Boeing lays off frequently, Hewlett-Packard, if I remember right, was in Boise, and the wife wasn't too thrilled about Boise, and this one with HEDB was – the work was much more varied.

Lisa Mighetto: Than it would have been in the district?

Jim Kerr: Then it would have been in the division. So that's why I came here, and it has been much more varied. You get to see the whole country, and that's what attracted me to this type of work, and basically that's why I've stayed for 25 years in May.

Lisa Mighetto: So you were both with the Central Branch, once there was a Central Branch.

Jim Kerr: I started out doing machine design for a few years, moved over to doing piping for a few years, moved back in 1991 to

head the Mechanical Systems Group, which it was cranes, hoists, piping, and fish bypass equipment, working for Larry Jacobs as a subsection head. Then, on or about 1996 they reorganized us into branches, and took all my employees away and said I could keep my grade and become a project coordinator, I said sure.

Lisa Mighetto: What do you see as being the major development during your time here? I mean, you started much earlier. Well, 12 years earlier, right?

Larry Jacobs: Probably a lot of the – some of the big changes I see is the way we have to conduct business. We were able to be, I guess, more free, interact with customers, clients, contractors. It seemed like a lot easier in some of the earlier days versus having to watch the rules a lot closer now, or have more people watch over your shoulders. I remember especially some of the most fun I had was at the start of the fish-screen era.

Lisa Mighetto: When was that?

Larry Jacobs: Oh, boy.

Jim Kerr: Mid-seventies.

Larry Jacobs: It must have been mid-seventies, yes. But the push was to get screens in, save the salmon. The colonel and generals pretty much said, "You shall do it," which really gave us a lot of freedom to go out and work with contractors. You still had to do things by rules, but you could almost direct them to do something, and they would do it,

and they knew they'd get paid, and contracting would back you up.

Lisa Mighetto: And that was pretty much across the board, not just fish facilities.

Larry Jacobs: Since I was in fish facilities, it's where I really felt it because if something would break, they would call us and say hey, we need you out here. We'd be out here to determine a fix.

Lisa Mighetto: Well, Jim Norlin just joined us and he's going to participate in the interview. But Larry was talking about the – I had asked you about what you said, the freedom to work with contractors and was that limited to fish facilities and you were saying well, that's what you were working in.

Larry Jacobs: Yes, what I was most familiar with. I know Jim had some of the private, Saint Helen's and the boats that – the fish boats that you'll probably talk a little bit about. I had tremendous freedom there, too. I was given a job, told to get it done, and pretty much had the backing of colonels, generals, the fish people, and contracting.

Lisa Mighetto: How do you account for the change? You're saying that changed at some point. Why did it change?

Larry Jacobs: I think just the oversight of probably Congress, budget restraints, probably other rules that were passed, and probably some abuse of rules, you know, where they had to step

in and prevent you from working as closely with contractors, and contracting, and projects, with a lot of paperwork to get it done.

Lisa Mighetto: So it had nothing to do with association with the district, which came later.

Larry Jacobs: No. No. I think that era had already started long before we became part of the district, having to monitor what we did, or pay more attention to the letter of the rules rather than the spirit of getting the job done.

Lisa Mighetto: You mentioned your work on fish passage facilities. Could you describe that a little bit, and you said mid-seventies would be sort of the beginning of that.

Larry Jacobs: Yes, it was. National Marine Fishery Service (NMFS) had developed a traveling screen, which is inserted into the intake of the powerhouses, and they were having problems, and since it was our powerhouse, I guess we got involved in the design of it, and the redesign of theirs.

Lisa Mighetto: What kind of problems?

Larry Jacobs: Life – lasting long enough to last a season, and also division of the fish, and we were – HDC was involved in designing, manufacturing, getting built in a very quick time anything they (NMFS) could dream up. We didn't really have a lot of control on what they wanted. We were just to produce

the item to do what they wanted to do.

Lisa Mighetto: So you did work with them.

Larry Jacobs: Yes, and it was a very challenging time. We were doing 100 percent of the design. It was not being contracted out, so as an engineer, it was great. I mean, you had to figure it all out. Then it was up to contractors working with a contractor to make sure it got built. If there were problems, you had to solve them and still keep it on schedule and get it built, contract negotiations, contract monitor negotiations.

Lisa Mighetto: Did you have certain contractors you worked with, or did it vary?

Larry Jacobs: It was always out to bid. Contracts were open for bid. Certain ones learned how to bid better than others.

Lisa Mighetto: Are there prominent ones that you remember?

Larry Jacobs: Oregon Iron built a lot of them; Transco built a fair number. A few contractors were notable because they went out of business trying to do it. And some would be lower bidder but we talked them out of it and told them they underbid. We explained what the work was, and they agreed, and decided it was smarter to back out than even get started. But that was some of the freedom that we could really sit down and talk with the contractors before and during the job, and really work

with them because we had a finite deadline. It had to be there on that date.

Lisa Mighetto: And what drove that deadline?

Larry Jacobs: The salmon smolts coming down the river. They came at a certain time of year.

Lisa Mighetto: The migration.

Larry Jacobs: The migration, yes. And so everything had to be done by that date regardless of when you got the date to go ahead, and as both Jims can attest, sometimes that came pretty late.

Lisa Mighetto: When you started in 1969, did you imagine that you would be working on fish facilities?

Larry Jacobs: No. I had no idea what HDC did out here when I first joined the organization. I mean, it was – what prompted the move was to go west and move out of Detroit, Michigan.

Lisa Mighetto: And no salmon in Detroit.

Larry Jacobs: No salmon in Detroit, they couldn't survive there.

Lisa Mighetto: What about the two Jims. You worked on fish facilities, too. Is there anything you wanted to add about that work?

Jim Kerr: When I started that – same thing. I dropped into

It was a challenging effort. We had little diverter screens that had to be kept clean of debris and all that. So all these challenges for a mechanical engineer to design these devices to do things that had never, ever been done before, and they had to work the first time.

Larry's branch – he was team leader at the time, I guess – doing cranes, doing fish cranes, doing pieces like that.

Lisa Mighetto: When you say doing cranes, that's not – could you explain what that means for a layperson?

Jim Kerr: The powerhouses have cranes on them to handle gates and turbines and generators, and when you put these lovely little fish diverting devices and fish-screen devices, the cranes need to be modified to deploy these devices. And so one step is to come up with the devices, and the next step is to deploy the devices. So there was always some crane work involved with having the cranes modified with extra hoists to actuate the devices, because the devices slid down the slot and expanded out to help deflect the fish.

Jim Norlin: I worked on a number of the auxiliary systems that were related to the fish passage. Larry and Jim worked more on the screens themselves. There was a – the fish were diverted up into the intake slot and then . . .

Jim Kerr: Bulkhead slot.

Jim Norlin: . . . bulkhead slot – no, intake slot and then moved over to the bulkhead slot, is that right?

Jim Kerr: No, one slot.

Jim Norlin: Okay. Anyway, there was a passage that had to be drilled in the concrete to go

through there, and a gate that came down to seal that off. They wanted light to attract the fish to this little hole that we're talking about, a 12-inch diameter hole. So we're having to design all these things in an existing powerhouse that – and drilling holes in concrete and figuring out where to put these things.

It was a challenging effort. We had little diverter screens that had to be kept clean of debris and all that. So all these challenges for a mechanical engineer to design these devices to do things that had never, ever been done before, and they had to work the first time. So it was kind of a lot of fun, and what Larry was saying, the last – the absolute last job that I worked on as a design engineer before I went into management was a device to look at the fish screens and some of the other screens down there to see if they were damaged or not. They used to have to pull them out to look at them, to inspect them, and that shut the unit down and shut the fish passage down. It took a lot of time and effort and manpower to do it.

So we devised a mechanism that had, I think, five video cameras on it that would drop down, and move back and forth and check every square inch of the screens, and I did my work pretty good the first time out, from what I heard. And that was a lot of fun to work on.

Lisa Mighetto: So it was successful.

Jim Norlin: Yes. And that was, I think, one of the things we

did. You know, we had minor problems, but a lot of the effort we made, we had to design something that worked the first time out and, you know, no prototypes. It was the only one, and it may cost half a million dollars to build it. And it was a challenge to make the thing work. We interacted a lot. Does this make sense to you guys, you know, that kind of stuff.

Lisa Mighetto: You interacted amongst yourselves?

Jim Norlin: Amongst each other, right.

Lisa Mighetto: With the biologists, too?

Jim Norlin: Yes. Yes, with the biologists. But it seemed like the biologists gave us the challenges, and we had to figure out how to make them work. But Larry mentioned also the date, having to be done with something and working close with the contractor, and I've got one story that I worked on.

I wasn't actually working in HDC at the time, I was working in construction, and we were doing a revetment down on the -- on a boat launch ramp on, I think, the Santiam River down outside of Eugene, and the contractor was trying to build this boat ramp and put in some concrete -- precast concrete beams down there for the bottom of the boat ramp underwater. It had to be out of the water by August 31st, and he was just fumbling and fumbling.

I was the government inspector on the job, the

government engineer, and he had divers there trying to put this stuff underwater. And finally the divers and I just pushed him aside and said, we'll run it-- we directed the crane operator on how to dig this and shape it, because the contractor couldn't do it. And we got it done in the time frame, but it was just, you know -- so, I mean, we never told anybody about it, but we got it done.

Lisa Mighetto: Were there other kinds of fish facilities that you later worked on? I mean, you were talking about the screens, right?

Jim Kerr: Our work was generally restricted to the powerhouse, so if it affected the powerhouse in any way, shape, or form, HDC usually did the work.

Jim Norlin: And the barges.

Jim Kerr: We had the barges, that's true. After we catch these little fish and send them down the channel that Jim Norlin talked about, they're routed around the powerhouse usually to another facility that the district would design for the biologist to look at, a little lab facility where they sample them and test them, and eventually shoot them back out in the river.

We did do barges. Jim Norlin and Duke Loney I think did the first batch of barges. I did the second batch of fish barges.

Jim Norlin: Duke Loney and Brian Moentenich did the first.

Jim Kerr: Memory goes when you get old. And these barges were used for upriver -- smelts upriver to get them down past Bonneville, so the ones at Lower Monumental, Little Goose, Lower Granite, Ice Harbor, and McNary, they'd load them onto the barges and bring them downriver and dump them at Bonneville. And we'd get a fleet of those barges.

Lisa Mighetto: And you did the second batch.

Jim Kerr: I did the third batch. I forgot that he did the second.

Larry Jacobs: I'm the first batch.

Lisa Mighetto: Were there modifications made along the way?

Jim Kerr: Oh yes.

Lisa Mighetto: What kinds of things did you . . . ?

Jim Kerr: The first batch they bought, rented, leased some old barges and quickly modified them to try out the thing, the concept. And when Norlin did his batch, they hired a naval architect to come up with a specific barge. So they got bigger.

Jim Norlin: That was the main thing, it got bigger, and we did refinements on how the systems all worked. There was -- pumps would bring in river water and circulate it through these big tanks so that there was a lot of water going through so the fish would -- you know, because

I got asked to do a super-quick design – concept design and put a contract together for a barge to be used up at Mount Saint Helen’s to keep Spirit Lake from overtopping. It was part of the emergency work after the mountain erupted....

they were packed together. The fish kind of looked like a fish hatchery in there. I mean, there were that many packed in of the little fish in the tanks on the barge, and there were aerating devices and so on. But we just basically did refinements on the next ones, other than the size kept getting bigger.

Jim Kerr: And then my batch, the third batch, was bigger yet again, another set of tanks up front and again more refinements for the crew.

Lisa Mighetto: How many fish would a barge hold?

Jim Kerr: I think each tank on the set I did was 50,000 pounds and there were six tanks.

Lisa Mighetto: That’s a lot of fish.

Jim Kerr: A lot! It was always pounds of fish, and I don’t know how many little fish that it takes to make a pound.

Jim Kerr: But maybe you’re talking about, six, eight, ten-inch fish on the salmon side, and the steelhead I think were the bigger ones.

Larry Jacobs: In the first batch, what I really remember is when HDC was doing the modifications, like I said; Brian and Duke were working on it. One was working night shift and one was working day shift, and whoever was working night would call in the office first thing in the morning and tell them what they needed to design that day. The person who would go

out on the night shift would grab those drawings; take it out for that work that night. I mean, it was designed on the fly. I mean, that’s the fun part of it. Brian and Duke were communicating back with the designers in the office, and literally taking the plans and instructions to the contractor out there on their shift, and then having to perform that work, and calling in and saying what needs to be done next, and really kept the office rolling.

Jim was a part of it at that time, and the technicians, and they were out there directing the contractor on-site during the construction.

Lisa Mighetto: Was the third batch the current batch, or has it been modified – the barges been modified since then?

Jim Kerr: I know Walla Walla District has built another batch after my batch, and I don’t know what they’ve done. I’m sure they’ve improved it and modified it, because each – each series you learn something. You try not to repeat the same mistakes, or you try to improve on maintenance or operational characteristics. So I’m sure they’ve done something.

Jim Norlin: Yes, there was a little option to that, too, again not fish related, but emergency related, in about 1981 or 1982, I can’t remember exactly, but because of the work we’d done with the barges. Duke Loney and I got asked to do a super-quick design – concept design and put a contract together for a barge to be used up at Mount Saint Helen’s to keep Spirit Lake

from overtopping. It was part of the emergency work after the mountain erupted, and we put together a design and had a contractor on board in about three weeks, I think. And the barge got built with – I want to say 30 diesel engine pumps on it in very short order, worked successfully, and allowed the contract work to go on.

So it was the experience we had with that that got us involved in a lot of, you know, real short-fused emergency work.

Jim Kerr: You were detailed over to the Portland District, weren't you?

Jim Norlin: It was a short detail, yes, but it was – we were asked specifically because of the stuff we had done on other things, so it was kind of fun.

Lisa Mighetto: On other things, was that specifically the fish?

Jim Norlin: Specifically the fish-barge experience, and the pump and piping experience that both Duke and I had.

Lisa Mighetto: So you developed a reputation for getting things done quickly.

Jim Norlin: Apparently, and it worked. So that was fun. We got – that took us in several times right into the red zone area around Mount Saint Helen's, flown out by helicopter, and we got into some pretty neat areas that you normally wouldn't get to see.

Lisa Mighetto: Right after an eruption.

Jim Norlin: Yes, fairly soon after. The original eruption, the big one.

Lisa Mighetto: And you were in on that. You personally were involved in that.

Jim Norlin: Yes. That was the – just before I came back to the Hydro Design Center in 1981, my last work in construction was on the cleanup after Mount Saint Helen's erupted. I spent – well, the mountain erupted on May 18, 1980, and I was up there a couple of days later and worked right up until January, the next year when I came down to HDC.

Lisa Mighetto: I'm getting a bit confused. When the barge was constructed for Spirit Lake, that was HDC, right?

Jim Norlin: That was HDC, and that was about a year later. It took about a year for Spirit Lake to fill up to where they got nervous about it.

Lisa Mighetto: So HDC was involved in the emergency work after the eruption.

Jim Norlin: Right.

Lisa Mighetto: Before we leave fish facilities, it sounds like that was a big part of the work, at least in the seventies and when you got here in the eighties. How about the minimum gap runner? That involves the turbine, right? So that would involve the . . .

One of my main goals was to work on the last ever big powerhouse, that was going to be McNary second powerhouse, working on the concept design of it, and we got through the feature design memo stage probably in 1983 or 1984 and then it died forever....

Jim Norlin: Well, even in the early seventies, at that time, in the mid-seventies and late seventies, we were still doing powerhouses on the Snake and other places. So the fish was a large portion, but most of the office, with the exception of probably the machine design crew, was really doing powerhouses. New powerhouses at that point in time.

Lisa Mighetto: Was that the case when you got here in 1980?

Jim Kerr: When I got here in 1980, the Bonneville second powerhouse was under construction. We were doing stuff on Libby at the time. What else?

Larry Jacobs: Probably the additional units on the Snake River still.

Jim Kerr: I think so. There were – it was starting to wind down on the new stuff. I don't remember that far back.

Jim Norlin: When I came back in 1981, one of my main goals . . . One of my main goals was to work on the last ever big powerhouse, that was going to be McNary second powerhouse, working on the concept design of it, and we got through the feature design memo stage probably in 1983 or 1984 and then it died forever. So, I mean, I did get to work on it, but . . .

Lisa Mighetto: Why did it die?

Jim Norlin: It never got built. I don't know all the reasons. I think politics were part of it, need, at least perceived need. I

know that the rehabilitation of the first powerhouse that's going on right now, or is going to be coming up is taking a lot of the need for the second one away.

The second powerhouse was – one of the main reasons is that McNary was like a flow restriction in the river. There was more water available than the existing generating units could use. So they had physical space and the need for a second powerhouse certain times of the year.

I think a lot of it had fish spill, probably took some of the need out of it, too, because they had to start spilling for fish rather than generating when they had all the water. So I think all those things combined.

Jim Kerr: The Corps itself has changed dramatically since I've joined in 1980. When I joined in 1980, Headquarters and the divisions were fairly autocratic, telling the districts exactly what to do. And over the course of years it moved to a lot of independence by the districts as their own little corporation almost, doing their mission. And now we're moving back to where the divisions have more say in what's going on, and Washington gets more say.

So we're kind of cycling back around, so we've kind of swing from Washington helping, to the districts doing stuff at the local level, and now we're emphasizing again trying to act like one Corps of Engineers on a nationwide basis with help from on high.

Lisa Mighetto: And how is that transition going as far as HDC is concerned? Are people...?

Jim Kerr: We've worked with it both ways. It doesn't really bother me one way or the other. The folks that I work with at the various districts are the same. The funding constraints are a bit interesting, where there is very, very little O&M CG funding out of Congress, but that's being supplemented by customer funding. But the actual folks you work with don't really change unless they retire. So you might have a different route for getting reviews done, or other people commenting. But I don't think it's affected us in a bad way. We just have to deal with it.

Larry Jacobs: After the fish, I guess probably my other interesting challenge was when we moved into a central region where as a supervisor I had mechanicals, electricals, [and] structurals working for me, and we worked for an area of the country, and trying to step from a narrow focus of machine design, into a much broader focus of multidisciplines, and being able to try and sell to customers that probably didn't want you in their backyard in a lot of areas, you know, because they had staff they felt could do the job as well, or better than you could. But by regulation you were supposed to be doing it, so you were trying to make inroads there without getting them mad at you.

Lisa Mighetto: And how did you do that?

Jim Kerr: Yes, let me know.

Larry Jacobs: Some places semi-successfully, other places not so successful. It went smooth some places, and others I think probably Jim can attest they're still fighting to this day, acknowledging that. And if there is plenty of money and plenty of work, it would be easy, you know. Everybody would have a lot of stuff to do. Short money, you protect your own troops first.

We, Don Fechner and I, were down trying to negotiate getting into pumping systems in Memphis District, and we started with a very long MOU. I think we ended up with a two-page one, which would have been pretty good if the project would ever have gone forward. But it was something both – we negotiated with the district, and both of us could live with. Now, I don't think it was entirely in conformance with the ER, but it was a foot in the door, and that's how I was looking at it. It's something to get a working relationship established.

Lisa Mighetto: And when was this?

Larry Jacobs: Oh, boy, it must have been 1995 or 1996 time frame.

Jim Kerr: Ninety-seven.

Larry Jacobs: Yes, in there somewhere, because the water table was dropping down there, and do the rice farming for Budweiser Beer, and they were trying to supplement the

water back in there out of a river. It would have been a very interesting project, and then it got stalled by politics down there, and they kind of drifted away, and I'm not sure if it's ever been built. I'm sure they haven't come back and asked us again.

Jim Kerr: Correct.

Larry Jacobs: And New Orleans is another real challenge.

Lisa Mighetto: And what happened there?

Larry Jacobs: They just prefer we didn't darken their door. They had ways of doing business in New Orleans, and with their contractors and people, and we were outsiders.

Jim Kerr: When they had revised our ER, and I don't remember what year it was, they added pumping.

Jim Kerr: So, suddenly we're having to talk to Memphis, who had done a lot of big pumping stations on the Mississippi, or Vicksburg that had done some big pumping stations, or New Orleans that had done some pumping stations.

Lisa Mighetto: And they were used to handling it themselves.

Jim Kerr: Yes

Lisa Mighetto: So it was a challenge to get information and help?

Jim Kerr: It was a challenge.

Jim Norlin: And I can attest to that, too. I was at that time managing the Atlantic Branch in the same kind of role Larry had in the Central Branch, and we got involved with Jacksonville District on pumping stations for the restoration work down at the Everglades.

Lisa Mighetto: Boy, that's a big project.

Jim Norlin: It was a huge project, and Jacksonville had done that sort of thing before, but they hadn't done it since the sixties. So we did have current expertise, and they recognized that on the mechanical electrical side. We were very short-handed on structural engineers, so we ended up with a team that – where we provided the mechanical and electrical design engineering. Jacksonville did the structural and earth work and so on, which was not that unusual. I think we had sort of done that powerhouse in the past – at least the districts used to do the entire earthwork and so on, and a lot of the structure outside of the powerhouse.

Lisa Mighetto: And did that work?

Jim Norlin: It did, actually, quite well, those we're constructing now, with the exception that when we wrote the contract, we expected the contractor to do a lot of the final little detail design, figuring out how to put in every single little pipefitting, and how to connect every single little wire. We wrote more of what would be called a performance specification. And

You do get to see lots of good people, lots of good work, and different ways of doing powerhouses because the Omaha Design Center and the Mobile Design Center do things a little bit different. So that adds to your database. And that's good.

the contractor that ended up getting the job, one of the two in particular, and then Jacksonville District expected us to have written more of an absolute put this wire here, put that wire there. And so that – during construction, ran into a lot of difficulties. Our folks had to do a lot of detail work kind of on the fly, as Larry mentioned earlier, and supported the contract work.

So there were some tense moments as a result of that. But I think the design came out real good overall, and it was – it was a little difficult working over that kind of distance. But with modern technology, it made it reasonably easy.

Lisa Mighetto: E-mail, for instance.

Jim Norlin: E-mail, Internet, electronic transfer of drawing files, and that sort of thing. We still did have to make a lot of trips down there. I mean, you just can't ignore the face-to-face.

Lisa Mighetto: Is that what you meant, Jim Kerr, when you said at the beginning that when you first took this job you were interested in – you're all over the country. You said something like that, that you travel a lot for HDC?

Jim Kerr: Well, when I first took the job back in 1980, it was just the type of work, from cranes to turbines, powerhouses, and when I took it in 1980, we did mainly the Northwest. So it was still much more varied than what I saw in the offering from Portland District, or Boeing, where you can

sit – they showed me a very large room of engineers with desks all touching, and you could design a bolt for a long time. So that's what I meant by varied, is you got to see different sights.

And when our mission–HDC's mission expanded to the nation, yes, I got to see the rest of the country, which I actually enjoy, seeing the different facilities. My only drawback is I drew the part of the country that is oh, so wonderful in the winter when you get to go to Garrison, North Dakota, and it's minus something outside, versus my dear friend, Mr. Norlin, who's lounging at Jacksonville, Florida in the winter, on the beach, enjoying his little job.

Lisa Mighetto: Jacksonville wasn't so nice last summer.

Jim Norlin: No. No.

Lisa Mighetto: I guess it's all timing, right?

Jim Norlin: It's all timing.

Jim Kerr: It's all timing. You do get to see lots of good people, lots of good work, and different ways of doing powerhouses because the Omaha Design Center and the Mobile Design Center do things a little bit different. So that adds to your database. And that's good.

Jim Norlin: Once we got established in that and started working with customers, I mean, there was the initial getting acquainted, you know. But once you had some successes with a certain group of customers, it

was good to work with the same people all the time.

One of the comments that I remember hearing from our folks down in the Southeast, some district, I can't remember which one came up with this, but it was – in our previous where we had the mechanical electrical groups, every time a new problem came up, we'd send somebody different down. They never got a working relationship established with people. And so by restructuring, we got those working relationships going and...

Lisa Mighetto: Some continuity?

Jim Norlin: . . . some continuity. We got to know the projects real well that we were working on, and as long as we kept, you know, as long as we could do a good job and deliver the work comfortably, I think the relationships went reasonably well. Where we had problems, then it started getting sticky again, you know, when things went wrong for whatever reason.

But it was good to get to know and work with a lot of people. Jim talks about traveling. I spent an awful lot of time in the Southeast – Georgia, Alabama. I had – actually, there's a branch office of HDC in Mobile that I helped establish. So I would go to Mobile probably four or five times a year. I got to know, you know, the city quite well, where to go, and that sort of thing. I enjoyed that.

Lisa Mighetto: That branch office is still there, isn't it?

Jim Norlin: Yes.

Lisa Mighetto: And that was Jim Kerr. Are there other developments that we should be sure to include in the history of HDC that we haven't covered?

Larry Jacobs: I don't know – in looking back on my thirty-plus years here and it went quickly, so I must have been having fun in spite of everything. I remember, like I said, things varied over the years from, the suit-and-tie era, to pretty casual, probably to almost too casual at times.

Lisa Mighetto: Were people wearing suits and ties when you got here in 1969?

Larry Jacobs: Yes, kind of, it was still a tie with a shirt and jacket.

Jim Norlin: I was actually working in the organization while I was going to college in that time frame. I was a summer hire. And what I remember, most of the engineers were wearing short-sleeve white shirts and ties, and I guess they'd throw a coat on when they left. But yes, but it was fairly formal.

Lisa Mighetto: And when did you start? You came in later, so we didn't get your . . .

Jim Norlin: We can do that – however you want to do it.

Lisa Mighetto: I just wanted the year you started.

Jim Norlin: I started with HDC in – let's see, it would have

I remember one lady one time saying – we were getting together for an off-site meeting, and one of the goals was to have fun, and she says, "I never, ever thought you'd have fun at work." I never thought you couldn't have fun at work... I never thought you couldn't have fun at work.

been 1968, in June of 1968, the summer.

Lisa Mighetto: So right before Larry, then. So they were wearing white shirts.

Jim Norlin: Yes. I had worked a little before that for the Corps, but in a different office.

Lisa Mighetto: When did things become more casual?

Larry Jacobs: It was kind of a regression, wasn't it, more than anything . . .

Jim Norlin: It was definitely different when I came - I worked - again, I worked summers - I worked from the summer of 1968 and then I was working on the co-op program the summer of 1969 through - so it would have been June 1969 through September of 1970 when I went back for my senior year in college, and that was fairly formal. I didn't come back to HDC. I worked in Portland District for 10 years. So I came back to HDC in January 1981, and by that time it had changed, definitely.

Lisa Mighetto: And by that time you were . . .

Jim Kerr: Well, in 1980 it was not that way, so it obviously shifted in - sometime in the seventies. And Larry can tell us exactly when.

Jim Norlin: Probably some of that occurred with the shift, or the move from the Federal Reserve Bank building over to the Customs House. It wouldn't surprise me.

Larry Jacobs: That may have been part of it. I don't know exactly when that was.

They had kind of social-talking about when I first came here, Christmas time. I mean, the people in the office were all families with kids essentially at that time frame, and Christmas parties were a big deal. I mean, they had trees, they had presents for the kids, and the families were down. It was a real family function.

Lisa Mighetto: Was it limited to HDC, or was it . . .

Larry Jacobs: Yes, we were all - since we were off by ourselves, I was over in the Federal Reserve Bank building.

Lisa Mighetto: Oh, right, before the Customs House, right. Okay.

Larry Jacobs: It was a real HDC gathering of families and kids and the whole works. And over the years, I guess as the kids grew up and everybody got older, it kind of moved away from that, you know, type of a family function to, I guess, a potluck at lunch and go back to work, you know, type of thing, which had been a dramatic change in the, you know, social climate over the years, and the bonding of the office people, or togetherness or whatever you want to call it.

Jim Norlin: At the same time, there's been a change to some smaller groups of folks, and I think Jim and Larry and I are sort of representative of that in that we get together and socialize

outside of work, I wouldn't say really often, but fairly often. And some of the socializing is work parties, working on each other's houses, or helping build something. And there is a fairly substantial group of people in HDC that participate in that kind of effort.

Lisa Mighetto: Even now.

Jim Norlin: Even now. They'll go to work at somebody's house . . .

Jim Kerr: Saturday at 7 a.m., Don's house.

Jim Norlin: Yes, they'll go over and work - and I've talked with many, many people who work in organizations whose people never, ever socialize outside of work. Work is work and my private life is my private life, and they never mix. And I see - you know, it's not everybody here, certainly, but there's a fairly good number of folks who have gotten to know each other a lot more than just in the working relationship, and I think it's great because I think it supports the working relationship, you know. Especially when you know people you can trust really, really well, you know.

Lisa Mighetto: It sounds like a close-knit group.

Jim Norlin: It was. I remember one lady one time saying - we were talking about getting together for an off-site meeting or something, and one of the goals was to have fun, and she says, "I never, ever thought you'd have fun at work." I never

thought you couldn't have fun at work. So that was interesting.

Lisa Mighetto: Did the staff change during your time here, in terms of the size or composition?

Jim Kerr: Dramatically. When I came on board in 1980, it was – I guess 110, 115, 120 folks. I mean, we had a full structural section. Quite a few folks back then, a good-sized staff.

As HDC's workload changed over the years, we changed staff size to accommodate the mission, as we moved more from new starts, new construction of new powerhouses to rehab, then as retirements happened, we downsized. I know for a while there we did not hire very many people in the mid-eighties to probably the mid-nineties. We didn't really hire many people, pretty stable work force. And now we're on the other direction where these old guys keep retiring on us, and now we're bringing in lots of younger engineers, and I quickly look around and I have discovered I am the old engineering running around the building.

So we have changed. We went from a very knowledgeable veteran work force that knows hydropower inside and out, and we're moving to younger engineers, more teaching of hydropower to the younger engineers, more knowledge transfer to the younger engineers, and . . .

Lisa Mighetto: Is that done in a formal way?

Jim Kerr: Unfortunately, no. We are struggling with this as each branch has gotten younger, which has affected how we do work, and HDC is currently looking and we are going to probably reorganize yet again to accommodate the shift in experience. Yet we still need to maintain the – like Jim Norlin mentioned a little bit ago – the common customer contact, the face on HDC. You don't want it changing all the time. But we have to do a better job of teaching the less experienced engineers.

Most of my staff is five years or less in Central Branch, and everybody keeps retiring on me.

Lisa Mighetto: What percentage? Most?

Jim Kerr: Oh, yes, three-quarters easily.

Lisa Mighetto: So you've lost that continuity and that base of experience.

Jim Kerr: Yes. Pacific Branch has more of the old veterans like Ron Leahey, who seems to refuse to retire. And then they've got more of the folks that have been around a long time. Atlantic Branch is starting to see similar pinches here with senior folks deciding to retire.

Jim Norlin: Kind of working all the way through that, I remember finding a phone sheet that I thought I'd left here, but I was looking for it a while back when I heard about this, from about 1968 or 1969, and if I remember right, there was somewhere close to 130 people

in HEDB at that time. And like Jim said, there was a lot of structural engineers and so on. And then that wound down to – I remember dropping in the late eighties to as low as sixty, something like that.

Lisa Mighetto: To roughly half the size.

Jim Norlin: Roughly half, and at that time I was just getting into management, and I know there were a number of studies done – it kept recurring through the eighties and into the early nineties, there were studies on the minimum size of HDC to maintain technical expertise. How small can you get and still not lose the expertise.

That sort of thing, and then the – was actually kind of what generated the nationwide mission because they thought we needed more work to maintain the critical mass of expertise, having the work to support. That was what brought in the pumping stations work, because our workload had been dropping off. So large pumping stations, the large hydro plants were similar. You use the same type of mechanical electrical engineering expertise, if you will.

And then I'd say, you know, we knew in the nineties that we were facing this retirement push, and so we started hiring young folks in anticipation of that, and worked on a big plan for it, but unfortunately, some of that got slowed down from what we wanted to do because of funding. We just – we didn't get funded at the level that we needed to, to bring on enough kids to support

When I was in engineering school in the late sixties, early seventies, I think there were four women in the entire Oregon State University Engineering Department. My daughter graduated a year and a half ago in mechanical engineering from Oregon State, and there were eithy five women out of three hundred and some. So it was almost twenty five percent. It's been a huge change.

that and get them trained early enough.

So there has been some gaps, and now unfortunately Jim's having to live with that, and deal with training all those people.

Larry Jacobs: During that same time period, when we were trying to rehire, one of the real challenges was that it was also a boom economy time, and kids coming out of college could get some really good job offers anyplace but the government. And for us to try and get quality folks and we'd rather have nobody versus ones that wouldn't fit into the office.

Jim Norlin: Particularly electrical engineers. We had a heck of a time finding anybody in that late nineties, mid- to late nineties time frame, coming out of school.

Lisa Mighetto: And now is it better in that sense?

Jim Kerr: Oh, yes. The economy is not good, and you get four pointers, and we've got a couple of the young engineers that have achieved a four point GPA for both the Bachelor's and a Master's. So we've gotten great candidates – top-notch candidates, and they seem to be enjoying the work because, again, of the varied mission across the country. They can be working on turbines one day, a fish crane another day, a piping system. So it keeps them on their toes.

Lisa Mighetto: And is there any other center like this in

another agency, or is this fairly distinctive?

Jim Kerr: The Bureau of Reclamation has their own hydro staff, and I'm not quite sure how they are configured, whether they're configured like us or not. TVA would have something similar with theirs, but again, I'm not sure how they are configured.

Jim Norlin: The Bureau of Reclamation has a technical services center in Denver, which is configured differently, but it's a similar mission to ours, in that they do hydropower design for the Bureau of Reclamation. They also do reclamation with their mission of irrigation, and they've got a lot of big pumping plants and a lot of water facilities. So it's very, very similar, and over the last several years we have been working – we used to be rival agencies, and we've been getting closer and closer with them over the last several years. We've actually stolen some of their people in the last few years.

Lisa Mighetto: So that's the recruiting strategy.

Jim Norlin: It is.

Lisa Mighetto: What are – so there are women now?

Jim Norlin: Oh, yes. That has also been a huge change, I would say.

Jim Norlin: Yes, that's the nature of the engineering business, though. I mean, when we were – well, when I was in engineering school in the late sixties, early seventies, I think

there were four women in the entire Oregon State University Engineering Department. My daughter graduated a year and a half ago in mechanical engineering from Oregon State, and there were 85 women out of three hundred and some. So it was almost 25 percent. It's been a huge change. And HDC's been getting more and more women engineers over the last – particularly the last ten years, and they're great, I think.

Jim Kerr: And that is – you're getting a woman engineer or a minority engineer is a function of the economy also because when the economy is booming, a lot of defense contractors and other folks target minorities, target women to bring up their diversity on their staff, and they throw a lot of money there in everybody's direction. So we have, again, benefited by actually some of the economic conditions and picked up very, very good staff for the young engineer.

Lisa Mighetto: Are there individuals that stand out?

Jim Kerr: Yes.

Lisa Mighetto: That we should mention in this history?

Jim Kerr: Of the young engineers? I think most of them. I'd hesitate to name them all because I'd probably forget some, but I don't think we've got a bad one among the lot. So I've ended up – I've got three women engineers in my branch to supervise – structural, mechanical, and electrical. So

they bring good perspectives, they're all great engineers.

Jim Norlin: In the time frame that I was back from 1981 until I retired in 2003, of all the mechanical engineers we hired, and I would just talk to mechanicals at that time, I would say there would be only one that I wouldn't hire again, and that person, thankfully, left after a couple of years. But we found good people, and made really good choices, and it was – there was a lot of effort that went into recruiting.

Like Larry mentioned, we were better off picking nobody than the wrong person, and we all had that philosophy.

Larry Jacobs: Like I said, when I got hired in 1969, I had sent my application form just to the districts that were an HR office. I got a call from HEDB says here's a job. I hadn't talked to anybody; nobody had talked to me. Whatever I put down on that paper, they believed and hired me, and I'm thankful for it. But our present – or when I left anyway, and I would imagine it's probably the same – we got a much more rigorous interview process, screening process, looking through the applicants, even though a lot of the people I hired, I'd get a stack on my desk when I was branch chief, and go throw a bunch aside, these look good, I'd sit down and talk to them and I'd say I want this one, and that would be it. Now it's kind of a team effort to interview them, look at them, do a very formal interview with them, get them in here . . .

Lisa Mighetto: Get them out here in person?

Jim Kerr: It's a formal interview process where you interview the short list of candidates, asking them all the same questions, and a team of folks, subject matter experts, senior management folks depending on the grade, and go through the process that way.

Jim Norlin: We were even going to the point the last couple, three years I worked here, I don't know if they're still doing it, but we would go to several of the universities that were relatively local – Oregon, Washington, Idaho – and go to career days, meet and talk with, you know, take resumes and so on, and as we got those in, we would look at them and even in just the short five minutes of talking with somebody you can get an idea if they're somebody that interests you or not. And combined with the resume, we may target half a dozen of those folks from a college career day, and have Terry Galloway, the admin officer, give them a call, invite them in over the Christmas holiday. Just come down and visit. We'll show you what we do, who we are – not an interview, just kind of a get to know us. And out of that, we might get one or two that would apply, and it was that kind of effort that I think helped get the good folks, because we certainly have, especially the last several years here.

Lisa Mighetto: What is turnover like, or can you tell? Is the staff so new there's no way to tell if people stay?

Jim Kerr: Well, we've lost a few in the last year or so. The retirement system changed, too. The new retirement system is similar to a 401k where it's Social Security and a thrift savings-type plan. So the thing is very portable versus the retirement system I'm on, which is a pension plan.

Lisa Mighetto: Which encourages you to stay.

Jim Kerr: Basically stick around. You've got to stick around for the magic 30 years. Like I said, August 4, 2011. So we've had one – Dr. Roos, Carolyn Roos, she left for a job working for the State of Washington, I think partly for the money, but mostly because the actual work was in the field that she got her doctorate in. So it's kind of hard to hold somebody in that area. And we've lost a few others. George Rainer went back to Idaho because he liked living there better than the metro area.

Jim Norlin: Jake.

Jim Kerr: Jake decided he wanted to be a teacher, and moved back to Vermont.

Lisa Mighetto: A whole career change.

Jim Norlin: A whole career change. The younger engineers seem to be more open to career changes, to changing directions, and the retirement system kind of helps them decide. They're not locked in here,

Larry Jacobs: I've noticed over a large part of my career is that people either like what we

do or dislike it. If you like it, you stay for the duration. If you don't, you're in and a couple of years later you're moving on, maybe just to the district. But you're moving out of HDC. But if you like the type of work we do, it seems like, you know, you just stay and live with it, and do it for your whole career. And the ones that don't like it are gone within normally two or three years.

Lisa Mighetto: Well, is there anything else in terms of development historically that should be included in this history that we haven't covered?

Jim Kerr: Well, we went through the computer age. We went from doing everything manually to doing everything with a computer.

Lisa Mighetto: Well, now, had the computer age arrived when you got here in 1980? I'm asking Jim Kerr.

Jim Kerr: Not really. I mean, I think they had like one portable computer that was about two-foot square and about six inches high, and it sort of did something.

Jim Norlin: And it was a Hewlett-Packard minicomputer.

Jim Kerr: That's the one I'm thinking about, the old Hewlett-Packard minicomputer.

Jim Norlin: It was in a room about this size.

Jim Kerr: It had not really arrived, and then from there we obviously had gone through

all the various generations of computers, from a shared computer to everybody gets one, to you can't live without it now because everything is done with e-mail. We used to write a lot of letters, a lot of – they were called disposition forms, typed up what you were telling somebody to do, and it's all e-mail now.

Lisa Mighetto: So do you spend a lot of time on e-mail, or actually less time because now it's...

Jim Kerr: You're talking to a senior manager. It's e-mail. Tons of it. That's my life; E-mail, meetings, and fussing with budgets.

Jim Norlin: Jim pointed out this – brought up this computer thing. I think it probably affected us two ways in particular, significantly. One is with the computer-aided drawing and drafting CADD work obviously. I think we did something smart there in that when that first started coming into effect, we decided to buy personal computers and use relatively low-end CADD software, AutoCADD as opposed to the big mainframe where you only can have one or two for all your technicians. So as a result, our technicians for the most part got CADD literate faster and easier, and we transitioned into it.

We actually totally avoided the big mainframe CADD stations. We always worked on PCs. So I think that was a smart thing for us to do. It was money drive primarily. We couldn't afford the big one.

The other thing, the e-mail change – back, I want to say late 1980s, every single piece of correspondence went out on a contract or anything dealing with any district or anything was a letter written, hard copy, that went through the chief of HDC, and he signed every letter personally. Now 99 percent of the business of HDC is conducted by e-mail or relatively low-level communications.

The chief of HDC doesn't see hardly anything technical anymore, where everything he used to see was technical, or virtually. It's – that's been a dramatic change, and as a result, the responsibility level has been driven down lower and lower and lower. The working engineer has a huge amount of responsibility that they did not have ten years ago or 15.

Lisa Mighetto: Do they see that as a good thing?

Jim Norlin: I think so. But I think a lot of them don't realize, especially the younger people don't really realize what it was because they're coming into it, and this is the way it is. But I think a lot of them like that. At least I've heard that from Generation Y or Generation whatever. I think it's a good thing, but it can get you in trouble, because the management can get blindsided now and then if somebody makes a bad decision. You just don't know about it.

Jim Kerr: . . . technical discussion over e-mail amongst all of our electrical engineers,

and customers – districts were involved, and just comments were flying back and forth, and people talking, or writing down stuff that was not technically correct near as I could tell, and actually the chief electrical engineer said it wasn't correct.

So it has its drawbacks. So suddenly we're bouncing stuff around, and we've got folks from the outside looking – or seeing this and it doesn't look too hot when they can suddenly see at least four or five different visions or versions or ideas of how something should be done.

Lisa Mighetto: And it's harder to control.

Jim Kerr: And it's harder to control. We have a design center. We should have one opinion, or at least – the trouble you get is you have three engineers in here, you will have three different opinions on how something should be done right now.

Jim Norlin: And they're all right.

Jim Kerr: Right.

Lisa Mighetto: You're saying that it was easier to coordinate...

Jim Kerr: It was easier because everything had to go through the director or the chief of HDC at the time. So that's one of the drawbacks. It's good to have the communication. Everybody is free to do the communication, and you used to not necessarily feel you were free

to challenge the vision. But now it's

Lisa Mighetto: More people have input.

Jim Kerr: Yes, more people have input.

Jim Norlin: When I first came in 1968, one of the things that – as a summer student, summer hire, I was rewarded at the end of my summer, before I went back to college, along with all the other summer students, we got a trip out to John Day Dam – John Day Powerhouse that was under construction, and we got a full tour of the powerhouse, and including going down in the water passage, seeing the turbine being installed, and looking at the gate, and watching the Columbia River leak past, and I mean, it's an awesome experience, because if you're never been in one – everybody that's ever done that remembers it. It's just one of those awe-inspiring things.

Came back to the office, and you can't believe how many of the senior engineers that had been there were envious of me because they had been working designing powerhouses for ten years, and they had never been to one. That is dramatic. I mean, our engineers can't work today without going out in the field. They have to. But you remember that, I'm sure.

Larry Jacobs: Talking about that reminded me of our training. Since I came from – I had already graduated, been working for three years and then came here, I was beyond the training level.

Here's a hydropower plant, here's a crane, do your job. Yes, right. What is this?

It was a long time before I got out into the field to actually see what I was doing. And we're supposed to have a training program for all new engineers. As Jim Kerr can attest, he came in on that training program because a fish – we grabbed him. I don't think he ever got off the train. We've now, I guess, progressed back to where we were originally and probably need to be. For all new engineers, there is a very formal training program, and it gets them out there, a variety of jobs, variety of assignments so that, like Jim says, they can see what the heck they're doing, and it makes a lot of difference.

Lisa Mighetto: Well, is there anything else that we haven't talked about?

Larry Jacobs: Probably could keep on going for hours. But, you know, as different ideas come up, the right moment, no, I can't think of anything.

Lisa Mighetto: What do you miss?

Larry Jacobs: Technical work. Do not miss the management end. When I retired, it was not a problem. I had been in management for a long time at that point. I always look back and say if I had been doing technical work, I don't know if it would have been as easy. But doing management work, it was real easy. And yet getting down and seeing something built, you know, designing it, seeing

it come to fruition, has always been great. Some engineers, you know, go into sales. If you're design engineer I guess you always will be, and you like to build something and see it come to actually happen and actually work, and that's the technical end and that's great.

Management, that wasn't my forte. There's probably many of the people out there who would say to this day it's not my crowning glory. But I do look back with pride on the designs and technical work I did.

Lisa Mighetto: How about you, Jim Norlin?

Jim Norlin: Well, I'd say the people, although that's not too bad because I still see a lot of people. Larry and I get together for breakfast every Tuesday, along with half a dozen other – four or five other guys we retired with. I see Jim and a number of others.

The technical work also, like Larry said, I'm trying to keep my fingers in it a little bit, doing a little consulting for HDC when I can. I'm involved with the Water Power Conference, and so I've got some technical things that I am keeping up with in my retirement. I'm working with ASME a little bit.

The biggest single thing, though, like Larry said, getting out in the field, or talking with the customer, and in particular I think in my later years while I was in management, one of the things I was doing was working on concept designs with the customer. I'd go out and find out

what their needs were and say, you know, how can we approach this? I wasn't doing any detail, but I was looking at the problem and trying to help figure out a way to get around it or solve it. That might be getting money, scheduling it, or technically or all three.

That's the part of it that I miss, getting out with the customers, out to the field, and seeing these things.

Lisa Mighetto: And Jim Kerr is not retired, but what do you like best about your job?

Jim Kerr: How about what would I like to miss? I would like to miss the management portion. What I like best about my job right now is teaching the young engineers. I have come in from one meeting and they might be huddled around their desk and I stick my nose in because I'm the boss, ask what's going on, and they tell me and I give them some nugget of insight – oh, we did it this way back then when I was younger and less gray. And I'd go on to the next meeting.

Right now it's the teaching aspect – the long meetings, the budget fussing and all. I won't miss that at all.

Lisa Mighetto: Even I know it now. Well, thank you all very much.

Lisa Mighetto: Well, I thought since Jim Norlin had come in a bit late to this interview that we could go back and talk a little bit about your background, how you came to work for HDC,

when, and what positions you've held, what you did all the time.

Jim Norlin: Well, I actually – if I could just go all the way back and work and work through it – I actually started working for the Corps of Engineers at the Materials Lab in Troutdale. I was part of the North Pacific Division, and that was in 1965. I was between my junior and senior years in high school, and I had done an interview with a place that said they think they might have a job for me, and it turned out my next-door neighbor worked for the Corps of Engineers, and when he heard that I was applying with the Corps, I think he put in a word, and before long I was out there and working.

I worked out there for, I believe, three summers, then the next year, which would have been 1968, is when I first actually worked at HEDB in the summer. The lab didn't have a job, and I was doing engineering work in college, and this fit what I was doing a whole lot better.

And then I worked – I took a year off of school between my junior and senior years and worked for a full year on cooperative education program with the Corps. So then when I went back for my senior year, I was actually still a Corps employee. I just went on leave without pay for nine months.

I was then hired after college by the Portland District and participated in the Portland District's training program. I went to work for the mechanical

section in Portland District after finishing the program, the EIT program, and probably – that would have been – I graduated from college in 1971, so it would have been about January 1973 that I started in the mechanical section. That was about the same time that I met my wife-to-be, by the way. She worked for the Corps of Engineers Portland District, and we got married in August 1974.

When we got married, she was actually working in HEDB as a draftsman, and – but anyway.

Lisa Mighetto: And what was her name?

Jim Norlin: Her maiden name was Patrician Moran, and we're still married. But she was a secretary for the Rivers and Harbors Section or Dam and Flood Control, I can't remember which one, when we first met, and then she started taking classes, drafting classes, and became a draftsman. Anyway, and then she quit when she had our first child and never came back to the Corps.

So I worked for about two years in the mechanical section for Hugh Millison, and then I moved into construction for about six years. And I worked in what was called the Supervision and Inspection Branch. I was the mechanical engineer there, and, effectively, I was the liaison between what was going on in the field and what the engineering people were doing. So my job was solving problems and acting as an intermediary there, and that was just an

incredible experience, to see how things went in the field and try to resolve those issues. It got me to working with lots of different people.

The highlight of that was the second powerhouse at Bonneville. I did get involved – substantially involved in the construction of that. So to see that going together – and that was one of the things that made me want to come back and work at HEDB – it was HEDB then still – on the design of McNary second powerhouse, which was to be the last big powerhouse on the Columbia River system.

I did work also in construction as an officer engineer. I was actually classified as a civil engineer for a few years and managing construction contracts, and I was doing that when Mount Saint Helen's blew up. I then went up and worked on the cleanup of that for about six months, and that was a life-changing experience, too.

I don't know, I was processing a stack of mail probably eight inches a day, and just writing 20 or 30 letters by hand, and working with contractors. We were doing, I don't know, five or six million dollars worth of construction a week. It was incredible. Just 10-12 hour days, six days a week, seven days a week. It was amazing.

But once that got routine, it got a little old and I was looking for a change, and the opportunity came up to come back to HEDB, and I was glad to take it.

Then in HEDB I started – or HDC, I started in the piping section and worked there for several years. And then, somewhere around the mid-eighties, there was a change in the organization, and the piping section and the heat and air-conditioning section combined together to become mechanical systems, and the mechanical systems, machine design, and turbines. So three sections under the branch, and after a period of time there, I became the chief of the mechanical systems branch. I can't remember the exact year. And then I did that for a few years. That's where I really started working close with Jim Kerr, as an example, and at that time Larry Jacobs was the chief of the machine design section.

And then I did several different temporary stints. There was a period of time where I was the deputy director for HDC on a couple of different occasions for maybe six months. I had a period of time in the early nineties where the mechanical systems group actually got so small that we went down to two sections in the mechanical, and I ended up working pretty much on my own as project manager. And that was some of the best time. I just basically told my bosses what I was doing. I had my own money and everything was great. I did that for about three years.

And then finally when the restructuring came about, I was selected as the chief of the Atlantic Branch, is where I finish up.

Lisa Mighetto: In 2003.

Jim Norlin: Right, in 2003.

Lisa Mighetto: Okay, well, thank you very much.

Jim Norlin: You bet.



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Interviewees: Jan Leader, Don Trotter, and Dave Raisanen

By Lisa Mighetto
November 18, 2004
Portland, Oregon

Lisa Mighetto: This is the HDC interview, Portland, Oregon, November 18, 2004, and I'm here with Jan Leader and Don Trotter. I suggest that we start out by having both of you briefly introduce yourself, talk about how you came to work for HDC, and what you've done during your time here.

Jan Leader: I'm Jan Leader. I work in the specifications area. My background is . . . I have two degrees; one an A.S. in mechanical and a B.S. in general engineering. I came here from the private sector, private industry, where I was an engineering technician draftsman. I worked in manufacturing mostly, in mechanical engineering. I came to work in HDC as a mechanical engineering technician for a couple of years in the mechanical section, and then I transferred to the structural section and worked for Don Trotter as a civil engineering technician in the specifications area, where I have been ever since.

Lisa Mighetto: When did you arrive?

Jan Leader: In 1979, November.

Lisa Mighetto: Okay. And how about you, Don?

Don Trotter: I'm Don Trotter. I came to work in this office in 1967. I have two degrees, one in civil engineering and one in architecture, and I was in the military in the Corps of Engineers for four years, and at Barkley Dam, Kentucky, which is a Corps of Engineers job.

I got out of the military on a Friday as a captain, went to work the following Monday as a GS-9 civil engineer doing basically the same job.

Lisa Mighetto: So you didn't waste any time.

Don Trotter: And I really wanted to move back closer to my family, which were in the state of Washington. I had the opportunity to go to work at John Day Dam during the construction, so I transferred in, and worked at John Day Dam during the construction, from around 1964 through 1967. And then I always wanted to practice architecture, so I had worked with the architects in HDC while I was at John Day, and they did the design work, and there was an opening here, so I was here from 1967 through 1988 when I retired, and went into private practice.

Rehabbing. Most of our facilities were built in the 1950s through 1970s and are now aging. The last new facility (powerhouse) was Bonneville Second Powerhouse completed in 1982. Since the early '80s we have been doing rehabilitation to our facilities.

Lisa Mighetto: And are you still in private practice?

Don Trotter: No, I was in private practice for 13 years, and I retired from that.

Lisa Mighetto: What do you see as being the major developments during your time here? Don, you start first.

Don Trotter: Okay, I think probably the biggest change was two. One was going to computer-aided drafting from the old hand drafting, and that was an evolution. That wasn't from, you know, one day we didn't say computer-aided drafting and design (CADD) is in and drafting is out. That took probably three or four years before it was pretty much fully implemented.

Lisa Mighetto: When was it fully implemented?

Don Trotter: Well, when you arrived, Jan, you were still doing manual drafting.

Lisa Mighetto: And that was in 1979.

Jan Leader: I think we started doing CADD somewhere around probably about 1984.

Don Trotter: When I first came to work they were still doing ink on linen, in 1967. So from 1967 doing ink on linen until ...

Jan Leader: Then they went to Mylar.

Don Trotter: Mylar and plastic lead, and eventually to

CADD. So from a standpoint of doing work here, the computers, of course, was a significant change in the organization.

Lisa Mighetto: Was that transition to CADD a smooth one, would you say? You said it took three or four years.

Don Trotter: Well, it did. Change is always hard, and a lot of the people that had been drafting for years had no computer skills whatsoever. And so trying to transition the workforce from manual drafting to computer drafting, there was a period when it was both because a lot of folks just didn't know how to do it.

Lisa Mighetto: And was there training?

Jan Leader: Yes.

Don Trotter: There was, but some folks, you know, still weren't able to really totally adapt to it, some of the people who had been doing it the longest. So ... and it was a transition period during that training cycle. So I think we started up when AutoCADD came out with version 2, and now AutoCADD is up a version.

Jan Leader: We don't use AutoCADD anymore. We use Microstation.

Don Trotter: I know; he changed again. But I think AutoCADD is up to, like, version 14 or 15, and they come out every couple of years. So that's kind of the time frame. Then they

changed to Microstation just after I left in probably 1990.

Jan Leader: Sometime around in there, yes.

Don Trotter: And the other thing that changed, as Jan was saying, the organization has just been reorganized many times over the twenty-plus years that I was involved. We moved also from – started in the Pittock Blocks, moved to the Federal Reserve Bank building, and then moved to the Customs House, then moved to here. And each one of those involved reorganization as well as a physical move. And for better or worse, other than the move here, I was involved in many of the room arrangements.

Lisa Mighetto: The room arrangements?

Don Trotter: Room arrangements, the space design, which was always challenging.

Lisa Mighetto: Did you have more space as you made these moves?

Don Trotter: No. Each . . .

Jan Leader: We got less space here, I think.

Don Trotter: Each time we moved we probably got less space.

Lisa Mighetto: Is that because of the size of the staff?

Don Trotter: No, it wasn't when we moved. But the staffing has gone up and down also. I was trying to remember what the staff

was. When I first came in, it was a very large office.

Jan Leader: We had about maybe 120 or more people when I first came here in 1979. We're down to – I don't know what it is now, about 85 or something like that.

Don Trotter: That was another change that occurred, and that was Corps-wide, but HDC was also impacted by it, and that was going through a lot of AE work, and there was a lot of – Jan was involved in the AE contract, and also was I. So that was another change, going from manual drafting to CADD drafting, and then . . . outsourced the drafting, finally, a large part of it.

Lisa Mighetto: You mentioned computers earlier.

Don Trotter: Well, you know, we were able – the Internet, the PCs on every desk was not there in the seventies – early seventies. That was something that came about, and learning how to use software and integrate the office was a significant change also. And then over time there became fewer and fewer new projects where you designed a powerhouse from scratch as part of a dam project on some river, someplace, and it became – moved into more and more upgrading and renewing existing facilities . . .

Jan Leader: Rehabbing. Most of our facilities were built in the 1950 through 1970s and are now aging. The last new facility (powerhouse) was Bonneville

Second Powerhouse completed in 1982. Since the early eighties we have been doing rehabilitation to our facilities.

Don Trotter: . . . rehabbing of existing facilities.

Jan Leader: Bonneville Second Powerhouse.

Lisa Mighetto: Did you work on that?

Jan Leader: Yes. I worked on some of the specifications, modifications to the drawings and was a concrete placement Government Quality Assurance Representative (GQAR) at the Project for 6 months completing the later units.

Don Trotter: . . . designed it. And we did projects all over – even in – we did one in – what's the name of that little island – Ponapi. A small powerhouse in Ponapi. We had people go to China to assist the Chinese government in figuring out how to do better in their design work.

Lisa Mighetto: When was that?

Don Trotter: Ken Laumond was the one that went, and that would have been in early eighties, I think.

Lisa Mighetto: Was that a powerhouse?

Don Trotter: Yes. I don't remember the specific ones. I know that we sent over some people that spent some time in China. We had a powerhouse in Ponapi. We've done underground

powerhouses that were in Snettisham, Alaska.

Jan Leader: Snettisham, and that was Alaska project.

Don Trotter: We've done – and then it changed from powerhouses when they kind of were no more of those to build and design, to rehabs in existing facilities, and then there was the push to go into designing of pump stations for power generation also, but it was a different kind of power. And I don't know if you guys even do pump stations anymore, do you?

Jan Leader: We have done some. We did one for McCook, which is Chicago. The project started in 1993, changed many times, and the final plans and specs were sent to Chicago in 2002. I don't think the Chicago District is doing the work, it's for the county. I couldn't tell you exactly. Jim Kerr could tell you.

Lisa Mighetto: Cook County?

Jan Leader: Yes, Cook County – Chicago.

Don Trotter: At the height of this office, we were doing multiple powerhouses of the same kind. We would have two or three different powerhouses on the boards at the same time, and these – I mean, I'm talking big things like Little Goose, Lower Granite, Lower Monumental, and Dorwshak and Bonneville I, Bonneville II, John Day, the whole gamut.

Lisa Mighetto: But that was winding down by the time you got here, right?

Jan Leader: Yes.

Don Trotter: In the eighties it started – in the eighties it was starting to go down. Bonneville was the last one. And then after that period of time . . .

Lisa Mighetto: Why didn't it continue? Was it because the supply, or the demand wasn't....

Don Trotter: I think the demand wasn't there. There aren't as many rivers that can be dammed. I think that the environmental constraints got tighter, and the economic impact, the environmental impact statements became much more difficult to get a project from the conception to the final design.

Jan Leader: There's always a tradeoff when you build a powerhouse with the wetlands, and so environmentalists get involved with it, and they're not happy about it. But then the other thing is, you know, it's reusable power that you're not burning fossil fuels for. So it's just a matter of what tradeoffs you can live with.

Lisa Mighetto: Jan, when you started, did you realize that it was sort of an end of an era when you were coming in?

Jan Leader: No, not really. I didn't know that. But the work has continued on because the powerhouses all over the country are aging, and the equipment is wearing out and running down.

They need to be upgraded, and generators are being rewound, the turbines and bearings are being upgraded to produce more power. So if we rehab all the powerhouses, by the time we get done, the facilities will be of an age so that we can start all over again.

Lisa Mighetto: Okay, and you mentioned pumping stations.

Don Trotter: That was another aspect that we did. See, when I first came in 1967 there was an architectural department that had four architects and a draftsman. When I left in 1988, I was it. And the reason I left is there was no more architecture to do. I mean, I was still gainfully employed, but it wasn't in architecture. It was project management, and studies for the chief of the office, a lot of management studies, and those kind of things.

Lisa Mighetto: What was that like for you? Did you like that change?

Don Trotter: Well, that's why I left. I really wanted to practice architecture, and as Jan said, Jan and I used to work together, and over there doing Bonneville II, I hired John Kyle who worked with us for.

Lisa Mighetto: John?

Don Trotter: Kyle, K-y-l-e. He worked with us for a few years. I've forgotten – about three, I think, and he couldn't stand interocracy, so he left. And John and I maintained the friendship

and a professional relationship. That's John there.

Lisa Mighetto: We're looking at a photograph album.

Don Trotter: And so when he left – and he opened his own office eventually – he would call me when he got behind and I would go work with him. So it came to the point where he said why you don't just come full time, and I couldn't because I had too much invested in this career.

So when architecture here dried up, the opportunity came for them to eliminate my job instead of eliminating an engineer's job. So I was able to get an immediate but significantly reduced pension. And so I left, so I could continue to practice architecture. And it's never come back. I mean there are still no architecture designs. So that was a significant change.

Jan Leader: They've only got two structural engineers now.

Don Trotter: There used to be an entire structural department – section that was probably . . .

Jan Leader: About 17 when I first came here.

Don Trotter: Yes, at least. I was going to say 20-25 people in the structural section. So that's another change that went when the construction went away, so to speak, and as rehab, the rehab is mostly mechanical and electrical. So that's another change that went through the office, is that the discipline of the engineers, the professionals that are hired here has changed over the years.

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Lisa Mighetto: And the pumping stations do require mechanical?

Don Trotter: Yes, they require mechanical – there's some structural with that.

Jan Leader: There's some structural, but not the same kind, not to the extent that it is required to build a powerhouse.

Lisa Mighetto: So the changes that you're talking about now are related to the reorganization that Jan had mentioned before we started rolling the tape?

Jan Leader: No, the reorganization was from the discipline organized (mechanical, structural, electrical) branches, to a regional organized (Pacific, Atlantic, Central). The Corps was downsizing and developing centers of expertise. HDC, Portland, Oregon, was designated as the only Center of Expertise for hydropower in the nation. There were two other centers of expertise for hydropower, which were Omaha District and Mobile. They shut those two down and made us the only one.

So we reorganized as Central Branch, Atlantic Branch, and Pacific Branch to serve those regions of the country, and broke our staff up and put some of each discipline in each one of those groups. It was good for the customer, perhaps in some regards, but difficult to maintain expertise within the disciplines, because they were spread out, and they weren't talking to each other, and keeping libraries, and keeping up with expertise.

The Corps was downsizing and developing centers of expertise. HDC, Portland, Oregon, was designated as the only Center of Expertise for hydropower in the Nation. There were two other centers of expertise for hydropower, which were Omaha District and Mobile. They shut those two down and made us the only one.

That was a significant change of philosophy of the organization when they went from having an engineer as the head to a non-engineer as the head, going in for more managers, and they don't have to have the technical expertise, they just have to know how to manage.

And then the other big thing that has happened is senior people have left, and we were getting a lot of new people, junior people in, and they don't have the background and experience. They don't have the mentors there to help them, which was a benefit when they were organized within the discipline. They had all the disciplines sitting together, and it was more helpful for them, for the younger engineers to have that mentoring more readily available. But now it's a matter of if senior people just take it upon themselves to mentor somebody. It's not a – well, we do have expertise groups, but how well they're working out I don't know.

Don Trotter: It's kind of a day-to-day basis, which is the way it was previously, before we had a structural section, a mechanical section, electrical section, and then the little subgroups within those. If you were sitting next to somebody who had been there significantly longer than you had, so even though you had a project and that person next to you may not have been working on it, he could still say hey, what about, kind of situation, and now it doesn't seem to be the same.

Jan Leader: When you have people being people, I think they get into little turf wars, you know, where they work for this area of the country and they might do things differently, and kind of sharing resources is a little bit of a struggle sometimes. And I guess that's in any organization you have that, but I think it's more apparent when we're in regions of the country. It seems

to be more apparent than it was when we were in the discipline groups. So they've done another big study, to figure out how to make HDC a more efficient and effective organization, and I think they have come around to the conclusion that perhaps they ought to go back and try to structure it somewhat like it had been before.

Lisa Mighetto: Oh, so there is talk about that.

Jan Leader: Yes.

Don Trotter: In the organization, one of the probably most significant changes that happened in this organization in the twenty-plus years that I was there was in the early years the head of the organization was always an engineer. And recently the head of the organization, I don't know if he's still there or not, was not even an engineer. Now it is

Jan Leader: An economist.

Don Trotter: He was an economist. That was a significant change of philosophy of the organization when they went from having an engineer as the head to a non-engineer as the head, going in for more managers, and they don't have to have the technical expertise, they just have to know how to manage. And that was a significant change in philosophy of the organization.

Lisa Mighetto: And when did that occur, did you say?

Don Trotter: After I left.

Jan Leader: Brent's only been in there since we moved here, so it's probably been maybe three or four years that we've had an economist. Traditionally the head of the HDC organization has always been an electrical engineer, except prior to Brent Mahan it was a mechanical engineer, Curt Faulconer.

Don Trotter: Yes, Curt. When everybody was still an engineer. The electrical engineer for probably the first – I don't remember how many years. I'd have to look back in there where they started, but there were all these electrical engineers who had told me – Hadley was also mechanical.

Jan Leader: But he was never head.

Don Trotter: That's right, he was never head. So Curt was the first non-electrical engineer. He was a mechanical engineer, and then it went to an economist. Here's Dave.

Lisa Mighetto: And that was a very recent development.

Jan Leader: Yes.

Lisa Mighetto: Well, we were just joined by Dave, so I suggest that we interrupt the interview and have Dave tell us a little bit about how you came to work at HDC, what you've done here.

Dave Raisanen: All right, well, I started to work in HDC in 1967. I transferred here from Bureau of Reclamation, and I came here as a structural engineer, GS-9. And I stayed here a whole bunch of

years. I worked my way up from a 9 to an 11 to a 12 to a 13, all in the structural section. I wound up as a 14 chief of the structural section. And then I retired in 1996.

Lisa Mighetto: Why did you leave the Bureau of Reclamation for HDC? What attracted you to this work?

Dave Raisanen: Well, it was different from what I was doing, but mainly it was promotions. I was getting nowhere, where I was, so I switched.

Lisa Mighetto: And you must have liked it, you stayed.

Dave Raisanen: Oh, yeah, yeah. I liked it. I liked the work.

Lisa Mighetto: Well, we've been talking about major developments that have affected HDC over the years. That would be important to include in its history, and we talked about AutoCADD on the computer. We were talking about the reorganization, and that's what we were talking about when you came in.

Don Trotter: We talked about . . . deletion of the architectural group early on, and then eventually pretty much the deletion of the structural group, at least vastly reducing the structural group, and going from construction to rehab as a primary function.

Dave Raisanen: That would be when we switched from the design of new powerhouses to rehab and redesign of what we

already had in existence. So yes, that was a big one.

Lisa Mighetto: Was that a change that you saw coming?

Dave Raisanen: Oh, we all see it coming, I think. It was a gradual thing. It wasn't just to hit a stone wall and start doing something else. But you could see in the late eighties things were already far down that path.

Lisa Mighetto: Don, I think you were talking about being led by an economist now as opposed to . . .

Don Trotter: Well, I haven't been there, of course, since that's happened. I was saying that one of the other changes that has happened in recent time is that we historically had an engineer in charge of the organization, and primarily electrical engineers until mechanical took over, and now it's a non-engineer that's in charge of the organization, and that's just a different philosophy than we've had for many years.

Dave Raisanen: One of the other things is we switched just after I retired from a division organization to a district organization.

Lisa Mighetto: And that was in 1996.

Dave Raisanen: That was in – yes, I think so – 1996, later on in the year.

Lisa Mighetto: And what did that mean in terms of the operations of HDC? How did that change things?

Dave Raisanen: As far as the operation, I don't think it changed a lot. It was just who you reported to that changed.

Lisa Mighetto: And you moved, right, from the Customs House.

Dave Raisanen: And we moved.

Lisa Mighetto: Is that why you moved from the Customs House here?

Dave Raisanen: It's part of the reason.

Jan Leader: Well, yes – yes and no. The building that we were in is not seismically sound enough for earthquakes.

Lisa Mighetto: In the Customs House.

Jan Leader: Yes. Everyone is moving out of there, so we just got a head start. Since we were becoming part of the district, it was advantageous to us to move over into this building.

Don Trotter: And the space here was in some respects nicer – this is Don – in some respects nicer, and definitely more modern.

Lisa Mighetto: Some people that I interviewed yesterday talked about the changes in work culture that they saw when they came here. Did you see that? When they came here to the Robert Duncan Plaza, they saw things had changed from when they had worked in the Customs House.

Dave Raisanen: I can't say. I never did work here. I quit before we moved.

Don Trotter: I talked to people who were still working when they moved over here, and I would agree that I think HDC was always kind of a free spirit out there someplace, part of the Corps, but kind of their own entity. And when they came over here and became part of the larger group, I think that was kind of a cultural shock from what people I had talked to were involved in. I personally never worked here under that condition, but that was my understanding, that it was just from going from an independent agency that was responsible basically directly to the division, to an organization that was part of a large organization.

Lisa Mighetto: Did you notice that, Jan? You actually went through that, right?

Jan Leader: Yes. I guess on a day to day basis, no, but overall I would say yes because we reported to the General over there, and now we report to a Colonel here, and we have the district influence over us, where we didn't really have that before. We worked for all the districts, and now we still do work for all the districts, but we're a district working for other districts, and so I think we were a rung up before we reorganized and became part of the district, and I think in that sense it's affected us.

Dave Raisanen: And in the eighties we switched over and started working for all of

the districts in the Corps of Engineers, and before that, it was just the North Pacific Division – Walla Walla, Seattle, Portland, and so on. So we got a much wider customer base after that time.

Don Trotter: Dave, do you remember the trip to China, and about when that was, and anything more detailed about it other than just a trip to China?

Dave Raisanen: All I remember, Ken Laumond was one of the guys who went. But when? It would have been in the early eighties maybe.

Don Trotter: May have been the early eighties.

Dave Raisanen: Yes, somewhere in there.

Lisa Mighetto: And the Chinese invited?

Don Trotter: Yes. We were – HDC was, I think, nationally recognized as a Center of Expertise for hydropower design, and I think that reputation spread – I won't say world-wide but internationally in large part because some of the papers that people in the organization wrote for various professional organizations, and I think that that enhanced the organization's reputation, and that was one of the reasons that the Chinese invited us over to assist them.

Lisa Mighetto: Were employees encouraged to publish?

Dave Raisanen: In the really early days I'd say not particularly, but after we started hitting the seventies and eighties, yes, we were encouraged to publish and take part in organizations – professional organizations.

Lisa Mighetto: Is this why, so that you get more exposure to other customers?

Dave Raisanen: Right, exactly.

Don Trotter: Yes, and I think it also – this is Don again – I think it also helped the various professions, be it structural, architectural or whatever, because when we were associated with the other professionals outside of our office, like I was a member of the AIA, which was encouraged by the office. I was able to associate with architects that were not doing necessarily just public work, and so I gained some knowledge about technology that I might not have known just working here, and then I could bring that back.

So I think the association with professional organizations was good, and I think both individuals as well as the organization gained from that change. We were kind of an inward looking organization in the early years, for the first – until the seventies, mid-seventies. We were pretty inward looking. We knew everything there was to know about almost anything to do with power. Anything else didn't really matter. And then there was a change in philosophy.

Lisa Mighetto: And what prompted that change?

Don Trotter: I think there were some people came in the organization that hadn't grown up in the organization, and I think that was part of it. I was trying to remember the chief of structural before you.

Dave Raisanen: Setvin

Don Trotter: No, before Setvin

Dave Raisanen: Oh, Lou Mroczkiewicz

Don Trotter: Okay, before . . . there was a guy who was head of structural. He eventually died.

Dave Raisanen: Well, let's see, Spicer was there when I came in, and then

Jan Leader: Setvin.

Dave Raisanen: No, somebody was there before him.

Don Trotter: That's the guy.

Dave Raisanen: Let me look it up.

Don Trotter: That's the guy, I think, that was really in my mind.

Dave Raisanen: Paul Drake.

Don Trotter: Yes, Paul Drake. He was pretty instrumental, I think, in changing that inward look to a more outward look, and getting us more involved. And it started with the structural group.

Lisa Mighetto: Where did he come from?

HDC was, I think, nationally recognized as a Center of Expertise for hydropower design, and I think that reputation spread internationally in large part because some of the papers that people in the organization wrote for various professional organizations, and that was one of the reasons that the Chinese invited us over to assist them.

Oh, there was one thing we did that might bear some note, and that is in the '80s we started getting into fish design, rehab design, how to get the little ones downstream mostly, past our powerhouses, past those turbines, and we did an awful lot of that.

Dave Raisanen: Oh, I'd say Omaha District maybe.

Don Trotter: Could be. He was in the Corps family, but he hadn't grown up as a young engineer in this organization. And he brought a different outlook in. And I think that – like I say, it started with the structural section and then it spread to the mechanical and electrical sections, and at the end I think probably mechanical and electrical, and it has to be that way now because there isn't much structure left. They really took greater advantage of the publishing of papers because they had more areas than they could publish about.

So I think it started with Paul Drake. Thank you, Dave; I couldn't remember his name.

Lisa Mighetto: We were talking about the Island of Ponapi, and what did you do there?

Don Trotter: We did the whole thing. Designs and helped to receive instruction. It was rather a remote island.

Lisa Mighetto: Did you travel out there?

Don Trotter: I did not. Many of our people did.

Jan Leader: Ken and . . .

Don Trotter: Al Hoadley.

Jan Leader: Steve Brockchink. Steve talked about his experience having to ride in a taxi with a pig.

Don Trotter: It was a totally different experience.

Dave Raisanen: Ken used to really complain about the warm beer.

Don Trotter: Yes. There wasn't a lot to do on the island when you weren't at work. So yes, it was an interesting experience. But I think that was the only . . .

Dave Raisanen: Well, I was thinking there's that other one on the Rio Grande, that Mexican-U.S. joint endeavor. What the heck was the name of that? It escapes me now. But there was that one. And then that dam on Puerto Rico. I designed a little powerhouse for it.

Lisa Mighetto: And when was that?

Dave Raisanen: In the eighties.

Don Trotter: Late eighties.

Dave Raisanen: Yes.

Lisa Mighetto: Do you do much international work now?

Jan Leader: We haven't been, but to say that our future – we wouldn't be doing that in the future, we might be.

Lisa Mighetto: Well, are there other developments that we haven't talked about that we should be sure to include in the history?

Don Trotter: I think that document that I gave you will really give you a good history of

the type of projects we did and some of the expertise we had, and I think a lot of that expertise is still here, it's just mostly in the mechanical and electrical side of the house.

Lisa Mighetto: As opposed to structural?

Don Trotter: As opposed to structural and architectural. You know, we won some awards for design work and all the disciplines over the time – over time, I should say.

Lisa Mighetto: Are there any in particular that stand out?

Don Trotter: Of course architectural.

Dave Raisanen: Private power. (Civilian/private companies installed powerhouses in Corps projects).

Don Trotter: Yes, I think there was – and I can't remember them off the top of my head.

Dave Raisanen: Oh, there was one thing we did that might bear some note, and that is in the eighties we started getting into fish design, rehab design, how to get the little ones downstream mostly, past our powerhouses, past those turbines, and we did an awful lot of that.

Don Trotter: A lot of research and development.

Lisa Mighetto: Did you work on that, Jan?

Jan Leader: Oh, yes. The traveling fish screen. We did those for years and years and

years. In fact, when I first came to work for the Corps, I had worked for a company, Western Machinery, which built one of the very first fish screens that the Corps ever built, and I worked on that while I worked there. And then I came to work at the Corps and I thought it looked kind of familiar.

Don Trotter: And we did a barge, we designed a couple of barges to haul the fish around, which is kind of an interesting departure from land-based facilities, in our mechanical sections.

Lisa Mighetto: Was that a challenge because it was different?

Don Trotter: Well, yeah, I think Duke Loney was one of the people that were kind of on the forefront of that, also, Larry Jacobs. It was a lot of mechanical. There was some structural as I remember.

Dave Raisanen: Not a whole lot.

Don Trotter: Wasn't a change rehabbing some existing barges?

Dave Raisanen: Yes, I think we did one of those.

Don Trotter: Hauling fish around the dam so they didn't have to go through the turbines, so that was quite a departure. But Dave's right, we did a lot of research and development trying to save fish.

Lisa Mighetto: Do you still work on fish?

Jan Leader: We haven't built any fish screens for a number of years now. I don't recall when we built the last ones; maybe five, six, seven years ago. So I don't know what they're doing with them now. They're just maintaining what they have.

Dave Raisanen: I think what happened was about the time I retired back in 1996, that sort of work evolved back to the districts that owned the dams, that they were trying to do something with. So Walla Walla took over here in the Pacific . . . [inaudible] . . . and Seattle District took over on their dam, and Portland took over. So I think you'll find most of that being done by the district office. .

Lisa Mighetto: So the minimum gap runner, for instance, probably is . . .

Dave Raisanen: Well, that's still HDC, the minimum gap runner. Anything that has to do with the powerhouse itself would still be HDC.

Don Trotter: Or the equipment within the powerhouse.

Lisa Mighetto: That directly affects the production of power.

Dave Raisanen: Right.

Lisa Mighetto: So now they're doing the fish screens.

Dave Raisanen: I think they are. They're working – all of that stuff is upstream of the turbines, you know, where the water comes in. So they do it, and then HDC reviews it to make sure that

they're not screwing something up.

Lisa Mighetto: So you haven't reviewed anything, but somebody at HDC does, maybe.

Dave Raisanen: I'm sure.

Lisa Mighetto: When you started here, did you think you would be working on fish facilities?

Jan Leader: Not really.

Lisa Mighetto: It's not what you'd expect.

Dave Raisanen: I don't think any of us expected it. It's just something that came up. All of a sudden we were losing fish, and the population in the rivers was nose-diving, and nobody knew why. So all of the biologists got together and said well, the turbines are one suspect. So if we can keep them out of the water that goes through the turbine, why, so much the better. So all of that stuff that we designed was mainly for that purpose, just to divert them so they didn't go down through the turbines.

Jan Leader: Has anyone ever concluded that the salmon population has come way up now?

Don Trotter: Oh, it has, yes, but I don't know if we can take any credit for it.

Jan Leader: A combination of lots of things – logging and animal waste being dumped in the rivers and all kinds of habitat things erupting again.

Dave Raisanen: Especially out in the ocean, you don't know what's happening out there.

Don Trotter: It wasn't for the lack of trying or the lack of money that we didn't.

Dave Raisanen: That's right. We spent millions of dollars on screens and bulkheads and so on, and used them one year and said nope, that ain't it, and threw them in the junk pile.

Lisa Mighetto: Oh, really? That's what happened to the old ones?

Don Trotter: It was an experiment. A lot of that was experimental, an effort to try and save some more fish so they didn't get chewed up by the turbines. And some of them worked very well and some of it didn't work quite so well.

Lisa Mighetto: And you didn't have other models to look at, right?

Don Trotter: No. We were really on the forefront of doing that. The biologists would come up with a theory and we'd implement some way to take care of that theory. So it was – it was really challenging – it was really outside the box we'd been used to working in.

Lisa Mighetto: Did people like that, or did they think well, this isn't what we signed up for.

Don Trotter: I think it was a challenge.

Dave Raisanen: Most of my engineers liked it. You could hear grumbling every once in a while – damn fish.

Jan Leader: It kept us busy for a long time. A lot of money went into it.

Lisa Mighetto: So it was job security?

Jan Leader: For a while it was.

Lisa Mighetto: Is there anything else that we haven't talked about? I see people are lining up outside, but we do have a few more minutes.

Don Trotter: Yes, it was a great career. I think that the things that were accomplished while I was here and was a part of were really long lasting, much more so than a lot of the projects that the young architects or the young engineers are involved in. There was a lot of responsibility put on the younger people that in the private sector were probably the senior people in the organization were doing, but a lot of younger engineers and architects were doing here. And there were significant impacts on the environment and on the economy, and on life in general that were a direct result of what this office did, because of the reservoirs that resulted from the dams and powerhouses, and the power that brought in the aluminum industries and the other industries.

So it was a significant impact on the communities around these various projects.

Lisa Mighetto: Was there a sense of that when you were working here? That is, did people understand?

Don Trotter: It was for me. I don't know about anybody else. I always had that feeling I was serving the community by making it a better place to live.

Dave Raisanen: A lot of times we would read what was in the newspapers and we'd say how in the heck did they get that idea, you know. Reporters never seem to write things down the way we thought they ought to be.

Lisa Mighetto: Did you have public affairs – or did you use public affairs in the district?

Dave Raisanen: Districts use public affairs people.

Lisa Mighetto: But nobody in HDC was devoted to public affairs?

Dave Raisanen: No.

Don Trotter: Our clients were the districts, so we were basically a consultant to them, and they would give us the problem and we would solve the problem, which was to design a powerhouse that produced X amount of power, and met all of the environmental regulations that we had to meet, and trying to keep it under budget and within the time constraints, and beyond that it was the district that took care of the community relations, the environmental impact studies, the other things that go along

with that. We were just really the design element of the projects.

Lisa Mighetto: Well, it sounds like talking to the media.

Don Trotter: Yes, well, that was the district's responsibility. We'd get – as time went on, our people got more involved. The district would call and ask a lot of questions before they would issue some releases to the press. But in the early days that wasn't the case. Like I say, we were an isolated Center of Expertise, and we were all quite happy where we were, and we thought we were doing good work.

Lisa Mighetto: What do you miss most?

Don Trotter: The people.

Dave Raisanen: Yes, always – it's always the people you work with and the people you got to meet all over the U.S. and while you were doing the job. But mostly, I think, people you worked with right up there on the spot.

Lisa Mighetto: Are you still in contact with some of them?

Dave Raisanen: Oh, yes. Structurals are getting few and far between these days.

Don Trotter: Architects are even fewer.

Lisa Mighetto: Well, Jan, you're still here. What do you like best about your job?

Jan Leader: Paycheck. No, I still enjoy it. We're still doing a lot of new kind of things. They're

...there were significant impacts on the environment and on the economy, and on life in general that were a direct result of what this office did....

I always had that feeling I was serving the community by making it a better place to live.

building new turbines that are more efficient, and they're doing different types of contracting all the time. So - we used to just do invitation for bid, the sealed bids, and now we do a lot more requests for proposals, and we're doing all kinds of inventive ways of doing things, trying to get into doing business a little more like industry does business. So that's a leap for us, too. We try to cut down on some of the paperwork and be more efficient. So that's a challenge and it's enjoyable to try some of those things.

Lisa Mighetto: You are the first woman that I've interviewed.

Jan Leader: I've probably been around the longest. When I first came here, there were no women engineers at all.

Don Trotter: Wasn't Margaret Ball still here?

Jan Leader: Yes, she's was an engineering tech, that's true. There were two engineering techs.

Don Trotter: When I came here in 1967 there was a woman architect named Helen Garry, who worked here for many years

... There was Margaret Ball who was an engineering tech, there were several women in the front office, and then there were some women in the electrical section, I believe, first, and then the mechanical section and Jan was one of the first mechanical techs.

Dave Raisanen: Then after Margaret, I think Sue Erickson

was probably the next engineering tech.

Don Trotter: She's still working?

Dave Raisanen: Yes, here in the district office.

Don Trotter: She's still here in the RDP building. But she was one of the first. So it started out with a very few women.

Dave Raisanen: And it's still hard to get women engineers. They're a scarce commodity even today, so you won't find too many out there even now, which is a real shame. I mean, it's a real great vocation to get into, and women can do as good or better than a man can in that kind of thing.

Jan Leader: In general I think they do better in some areas because it's a challenge to them, I think, to even get into engineering school and get through it. So I think they're a little more devoted sometimes. The ones we have gotten in HDC have been outstanding.

Dave Raisanen: Oh, by the way, I remembered those two projects. Cerrilos Dam in Puerto Rico and Amistad Dam on the Rio Grande between Texas and Mexico.

Lisa Mighetto: How do you spell Cerrilos?

Dave Raisanen: Cerrilos, I think, or some reasonable facsimile thereof.

Lisa Mighetto: Well, is there anything that anyone would like to add? Thank you all very much.



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INTERVIEW
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Interviewees: Lee Sheldon and Rich Vaughn

By Lisa Mighetto
November 18, 2004
Portland, Oregon

Lisa Mighetto: This is the HDC interview, Portland, Oregon, November 18, 2004, and we're here with Lee Sheldon and Rich Vaughn. I suggest we start out by having both of you introduce yourselves briefly and talk about how you came to work for HDC and when, and what you do here.

Rich Vaughn: Yes, I was first introduced to HDC, or at the time it was HEDB, when I was in college at University of Portland, and they conducted some interviews, or they found some – or conducted some searches. And I came in and interviewed and was impressed with the organization, and was also, I suppose, successful in finding a position.

Lisa Mighetto: And that was in 1981?

Rich Vaughn: It was in 1981.

Lisa Mighetto: And this is Rich Vaughn. Okay.

Lee Sheldon: My name is Lee Sheldon. I worked in what was then known as the Hydroelectric Design Branch from 1971 to 1979. The entire time I was in the turbine section as an assistant to Chester T. Scott, Jr. I came to HEDB from the North Pacific Division Hydraulics Laboratory, which was located at Bonneville Dam. I went to work in that laboratory –

Lisa Mighetto: When was this?

Lee Sheldon: In 1969, upon the completion of graduate school and military service. In 1979, I received a promotional transfer to the Department of Energy in Idaho Falls, and after retiring from the government service in 1994 and working for a couple of consulting companies, one of which you've never heard of. It's located in Houston and it starts with an E, and Ken Lay was the chairman. (ENRON)

Lisa Mighetto: Not working there anymore, right?

Lee Sheldon: No, I'm not. I got to go out in December with the mass crush. But I was able to secure a part-time position as a contractor working for a company by the name of N-LINK, spelled N-LINK, who has me seconded back here to the Hydroelectric Design Center, essentially in my old group.

Lisa Mighetto: So you live in Houston but you contract with –

Lee Sheldon: I live in Houston. I work here about three out of every four weeks, and I tend to go home when my wife calls and says she's forgotten what I look like.

Lisa Mighetto: What do you think were the major developments in HDC when you were here?

Lee Sheldon: In HDC, meaning this current –

Lisa Mighetto: Or HEDB, sorry.

Lee Sheldon: HEDB. At that time, HEDB was involved heavily in the construction of – or was still involved in the construction of Corps projects here in the Pacific Northwest. In particular, at that time, we were completing the skeleton bays of projects, the Bonneville II powerhouse design, Lost Creek design and construct, New Melones design and construct –

Lisa Mighetto: That's in California.

Lee Sheldon: And it was later transferred to the Bureau of Reclamation for operation. So it was an active construction office in that period, whereas now – basically, maintenance, refurbishment, and upgrade of existing facilities is our primary effort.

Lisa Mighetto: And that's what you're assisting in when you work here as a contractor?

Lee Sheldon: Yes. More specifically, my particular efforts are directed towards optimization. That means maximizing the efficiency of generation through new methods of automatically testing the efficiency of, in particular, Kaplan turbines and computer programs that allow us to share load among the different machines in a powerhouse in an optimum manner.

Lisa Mighetto: And you mentioned that when you first came to HEDB, the projects were mostly in the Northwest. I mean, there was a California project there, but it was mostly in the Northwest. Is that true now, when you're working as a contractor, or are you working on other regions, too?

Lee Sheldon: At that time, in the seventies, HEDB was a branch within the North Pacific Division, and therefore concentrated pretty much on projects in the Northwest. Today the organization has three branches – Pacific, Central, and Atlantic – and is the center of expertise for the country.

Lisa Mighetto: When you are working as the contractor, are you focusing on projects here in the Northwest – are you with the Pacific Branch?

Lee Sheldon: I am with the Pacific Branch, and yes, we're working – this optimization effort right now is being done on projects in the Pacific Northwest, for convenience of location. We anticipate the results, of course, to be applicable nationwide.

Lisa Mighetto: Okay. Would Houston be in the Atlantic, or the Central [branch]?

Lee Sheldon: However, as flat as that part of Texas is, I don't think there's much hydro down there.

Lisa Mighetto: Okay. Well, there are storage dams, right?

Lee Sheldon: There's a fair amount of hydropower in Texas, but it's not in the Houston local, which is low-lying and extremely flat.

Lisa Mighetto: Okay. Well, Rich, how about you? You came right about the era that Lee had left, right?

Rich Vaughn: Yes. As I was leaving, we were finishing up Bonneville II powerhouse. But I think that was the end of constructing, and the end of the real heavy civil works concrete stuff in the business that we were doing.

Lisa Mighetto: Did you work on the second powerhouse, or on the finishing up?

Rich Vaughn: I was a trainee, and I was assigned for a few months that I worked helping inspectors on the second powerhouse, and at that point they were installing units, you know, the concrete was all there and it was work on machinery, and piping, and those type of things. So it was – it was some of the latest final work. It was not that many months after I started that they completely wrapped the project up.

Lisa Mighetto: So what kinds of projects then did you work on?

Rich Vaughn: Well, you know, I think the biggest – one of the biggest developments that I saw over the next years, and I think Glenn Meloy was probably the leader in the effort of trying to establish us as the center of expertise at the time when we had our office, ATDB, Mobile, and Omaha, because we had expertise in three areas, and I think he was instrumental in working the issue of creating our office as the center of expertise. That was one of the big developments.

I think in that time window, before we reached that point, we were somewhat searching for an identity and a mission. I remember there were certain lean years where there was some maintenance type work and repair work, but there were also some time windows in there, and one was pretty early, that we had a layoff which was pretty significant.

Lisa Mighetto: Was this in the eighties?

Rich Vaughn: Yes, in the early eighties.

Lisa Mighetto: Did you see any of that, Lee, when you were working here, the searching for a mission, or was there a sense that it was the end of an era?

Lee Sheldon: There was a sense that we could see the end of the era coming, but at the time that I left, we were still very busy

project-wise, construction-wise, and so on.

Lisa Mighetto: And what was the size of the staff, approximately?

Lee Sheldon: My memory says somewhere around 110 or 115.

Lisa Mighetto: And how about when you came on board?

Rich Vaughn: It was in the 70 to 80 range. It might have been a little bit higher when I first was there, and then it dropped down. It dropped down below that, and for a time it was significantly below that.

Lisa Mighetto: And that's because of the routines and direction?

Rich Vaughn: The type of workload that we had available when there weren't new powerhouses to construct, at least big ones, the amount of work was much more varied and less focused. Now we focus on upgrades, getting more power, maintenance, repair-type activities. At that time, it wasn't quite that focused and clear which direction we were heading.

I know we spent a lot of time for a while investigating small hydro sites, a lot of which didn't really pan out. And actually, from our standpoint, we never really did very many of those. But we did later start to progress where the federal government was not involved with those, but we had sites that had potential, so we worked with contractors as they

were installing new generation capacity, in small hydro at some of the sites that we owned.

Lee Sheldon: Part of the reason the Corps probably never got into small-scale hydro was at that same time, in response to the energy crisis, the Department of Energy established a small-scale low-head, hydro program that was quite active. So, basically, DOE was doing a great deal of the small hydro.

Lisa Mighetto: And that's where you went.

Lee Sheldon: That's where I went.

Lisa Mighetto: Did you work on small hydros then, there?

Lee Sheldon: Yes. The Department of Energy had three programs. They had a research and development program, they had a loan program, and they had a demonstration program. The demonstration program involved the construction of 20 small-scale hydro projects around the country, and I was in charge of the demonstration program.

Lisa Mighetto: And you said that you worked on some small hydros in the beginning, right?

Rich Vaughn: Well, the ones that I was involved with was more – I wasn't as directly involved as some people. For example, there was Ponapi in the South Pacific, and Rod Wittinger was pretty heavily involved with that. I had some involvement, but it was to a much lesser extent. I think more of the ones that I

worked on were working with other nonfederal parties who were installing hydros at some of our sites like Colebrook and New Hampshire, Wenatchee up on the peninsula.

Lisa Mighetto: Did you travel to these sites, or did you stay here in Portland?

Rich Vaughn: The type of work that we had to do there didn't require traveling, and in order to do what I had to do on those, that would have only added cost to the project really, and on those particular ones I didn't really need to travel.

Lisa Mighetto: So what else has your work involved since you've been here, which is 24 years now, or 23 years.

Rich Vaughn: Yes, it's getting up there. I know – I'm currently working in Central Branch, but I worked several years in Pacific Branch, and before that was in the mechanical – more accurately the machine design section, which was part of the mechanical branch – and I did a wide variety of mechanical systems work that was non-turbine work, and I worked a lot on fish-passage systems.

Lisa Mighetto: I was going to ask you about that. When did you start working on fish-passage systems?

Rich Vaughn: Well, right about when I started here. But I think I worked into spending more time after I was here probably maybe about three years. And then I was spending, up until about the

year 2000 or 2001 I was spending a significant portion of my time doing a lot of those systems.

Lisa Mighetto: And what did that work involve?

Rich Vaughn: A lot of it was fish screens and we started with the earlier generations of traveling fish screens, and there's a lot of accessories that we would design that were used in testing and evaluating those two. Later we progressed to developing a longer fish screen that was a forty-foot long screen to enhance the fish passage. And so I was involved with – both with design and also the improvement and evolutionary process of trying to turn those from prototypes to final product, you know, get it to where you can meet the needs of a project and the maintenance staff better, and trying to improve those.

Lisa Mighetto: Did you work with biologists?

Rich Vaughn: Yes. There were a lot of different biologists that I worked with, and there were – actually, in the later nineties – there were some of both the work with waterways experiment station, and some that worked later with other organizations like Battelle, that I worked closely with in doing tests and measurements, and some in evaluations.

Lisa Mighetto: Did you like working on fish-passage facilities?

Rich Vaughn: For me, I think I was probably one of the

unusual ones. I think a lot of my cohorts – sometimes that type of work was not fun, and it was sometimes distressing. I enjoyed it, and I personally liked working with a lot of the biologists, most of them that I worked with.

Lisa Mighetto: Why was it distressing?

Rich Vaughn: Well, I think you work in an area that's outside of really the power train of the plant, where the real action is, and in some cases you're made to feel that you're not really in the center of some of the most important things.

Lisa Mighetto: Production of power.

Rich Vaughn: Production of power. And when you're relating to project styles that can create some challenges, but I think as long as you're working on it in a way that they know you're trying the best you can to get them something that will work well –

Lisa Mighetto: Did you ever think when you started working here that you'd be working on fish-passage facilities?

Rich Vaughn: Actually, early on, I kind of thought that was one of the things they were doing. I like machine design, and the part that I liked about that is you were really getting in and designing every part yourself, and every piece was your responsibility to make it work. It wasn't your role to oversee somebody else doing that work. You were responsible for creating something that would work in the end.

Lisa Mighetto: So direct hands-on.

Rich Vaughn: Yes. So that was one of the areas. I also spent quite a bit more time working with development of 3-D cams and for turbine blade control, and then later got into the governors, spending more time in those.

Lisa Mighetto: Lee, did you work on fish-passage facilities?

Lee Sheldon: I do work on them now.

Lisa Mighetto: But not in the seventies.

Lee Sheldon: No, not here in HEDB. I did, of course, at the hydraulic lab where we designed fish ladders for the projects. As a historic note, I am reminded of when HEDB first sought to get involved in small-scale hydro. We were tasked by Headquarters to design a small-scale hydro project for the military academy at West Point, which we did, although to my knowledge it was never constructed.

Lisa Mighetto: Okay.

Lee Sheldon: Today we work with fish screens in terms of improving the performance of the generating equipment when fish screens are in place, because they disrupt the normal hydraulic flow. This necessitates changes in control systems and so on to still try and maintain the maximum efficiency on the machines.

Lisa Mighetto: And do you [Rich] work on this, too?

Rich Vaughn: Well, I have spent time working with cams, not in the optimization sense of the word. The type of things that Lee is working on is really maximizing performance. I was more involved in developing cams that we use for blade control, and Lee is – in a simplified form – the things that Lee was working on were the brains or the smarts for actually knowing where to adjust those cams. I was working on mechanical linkages, things of that nature, and also governors.

Lisa Mighetto: And what's a governor?

Rich Vaughn: A governor is, in its simplest term, the device that controls the speed of the unit. Or it gets the – as you're starting the unit up – it gets the unit rotating at the proper speed so that when you synchronize it to the grid, it has to be at 60 Hz, the rotating speed. And then once it's online, the grid itself controls the speed of the unit, but all of these governors work together in conjunction, each making small adjustments to control the speed. A lot of that is actually not done by the governor anymore; it's done by the plant control systems, and load adjustments. And it also provides a means for all of the governors, as the load changes on the grid and everybody turns their lights on and off, it allows them to play in the sandbox nicely together and adjust load.

Lee Sheldon: You may think of the governor as the device that regulates the operation of the generating equipment, controls it.

Lisa Mighetto: So that would be not only at a specific project, but also from project to project, coordinating it?

Lee Sheldon: Well, there's a governor on each unit. In the old days they were mechanical governors. Today they are electronic programmable governors.

Lisa Mighetto: And when did that change take place?

Rich Vaughn: It's happening now. We really have governors that – most of the governors that we have in the Northwest are still mechanical, and we are currently in the process of upgrading, removing the mechanical portion of them and replacing it with electronics.

Lisa Mighetto: Had security become an issue for your work, or have things not changed since 9/11?

Lee Sheldon: It is something that we certainly have to address these days in terms of our contractors, in terms of site access for our contractors, in terms of clearances for them, far more than we did in "the old days." Even access to this building for contracted persons working with us, or for us.

Rich Vaughn: I would say for the most part for me it doesn't affect it too closely, but there are systems that we've designed where we've given consideration to be able to – you know what we'd really like to be able to do is have some access to see data, to view the internet on this system

or this machine, and a lot of times that really isn't the most secure thing to do. So we have considerations like that.

Lisa Mighetto: Well, I wondered even about the operation and generating equipment and whether that was an issue.

Lee Sheldon: Electronic security is certainly becoming more important, as we go more and more to online systems. The possibility of viruses in our generating controls; we are more and more having to address this issue.

Rich Vaughn: And even being able to secure our systems so they can't be tapped into. I think it's a consideration in places where we might use wireless sensors and making sure that it's not possible to breach into the system and gain control somehow.

Lisa Mighetto: How about computers? Were you using computers when you left in 1979?

Lee Sheldon: I had a slide rule on my desk, I had a circular slide rule in my pocket, and we used the old Monroe mechanical adding machines, and I can remember when Mike Ball brought in the first Hewlett-Packard little pocket calculator. So no, when I left we were still using slide rules, just on the verge of the electronic calculators.

Lisa Mighetto: And when you arrived, PCs existed. Were they here?

Rich Vaughn: They weren't on our desks probably until the mid-eighties, about – it might have been somewhere around 1985.

Lisa Mighetto: So you were here when that happened.

Rich Vaughn: Yes, when they first showed up, and the first batch that we got was through a government contract, and they were called Comets, and this first batch of PCs were made in somebody's garage using parts bought from different suppliers. It was quite an interesting deal because it was – it was not your typical dollar gateway venture. It was something that somebody pieced together and it took them a long time to build them because they kind of had this real small-scale operation.

Lee Sheldon: I think the first electronic device we had in the office was a digitizer, which is a small plotting table you can put a graph on, and with a stylus you can record data points, which were then electronically recorded in the box.

Lisa Mighetto: And this was in the seventies that it was available.

Lee Sheldon: In 1977, 1978, somewhere in there.

Rich Vaughn: Yes. Well, I know when I was first here what we had for a computer, we didn't have PCs. There were a couple of small Hewlett-Packard computers that you could use. More or less they served as advanced calculators, and there was one Hewlett-Packard machine that

had a floppy disk-drive that was about the size of a coffee table and it had, I don't know, they were eight-inch disks, maybe even bigger. They were big. And they stored, oh, I don't know, not much, maybe 32k.

Lisa Mighetto: And you said by the mid-eighties there were PCs?

Rich Vaughn: And we had PCs.

Lisa Mighetto: Do you remember how they were received? Were people glad and excited?

Rich Vaughn: They were happy to get them. However, one thing that happened when we had PCs, I know earlier we had some computer terminals here, and we were hooked into Boeing mainframes, and we had a service there, so we could do some interesting things. Like we were able to do some finite element analysis and using access, but you paid – you paid a price every time you got in and connected to their system, especially when you were processing. So, you know, that got fairly expensive, and when we got PCs, the mentality shifted all of a sudden, that we certainly don't need that anymore. But it took us several years to catch up to the fact that, oh well, we can't do this analysis anymore. We have to buy some software.

Lee Sheldon: We did have, of course, computer design capability when we were located over in the Federal Reserve Bank building. We could type into the

mainframe computer over in the Customs House with, I believe it was FORTRAN and Job Card Language (JCL), run a program. But to get the answer, to get the complete printout, we had to walk over to the Customs House, get the printout, walk back to the Federal Reserve Bank, look at the printout, and then if we needed to, rerun the program. One got one's walking exercise that way, certainly.

Lisa Mighetto: Are there other developments that – I see people are lining up outside. I didn't know that it was getting so late. Are there other developments that we haven't talked about that would be important to –

Lee Sheldon: . . . change since I was here, and now that I'm back here is the fact that the organization has gone from one that was organized on disciplines, to one that's organized on geographic. I think that's the most significant change I see, or I've noted.

Rich Vaughn: From my standpoint, I see an important development is where our funding sources are. In the past we worked on money that was congressionally funded, and now that forms a very small percentage of the work that we perform. It's customer funded money, and –

Lee Sheldon: Direct funding from BPA.

Rich Vaughn: Yes, typically. That's where it started, and now it's growing in the rest of the country. It's lagging behind in

the rest of the country, but we are getting funding from Southwest Power (SWPA), Western Power (WPA), and Southeast Power (SEPA).

Lee Sheldon: And interestingly, I noticed that when I was at BPA, I worked on yearly stages of the direct funding to the Corps.

Rich Vaughn: And that was a huge development. But I do remember the apprehension early, with the Corps of Engineers in particular not wanting to go that direction for various reasons, but, I mean, it was something new. It was definitely unknown, and how are we going to control this work and this funding, and how is this relationship between us and the customers going to develop, and what direction will it take us.

Lee Sheldon: There was apprehension over the fact that along with the direct funding would come oversight by other – another federal agency over the Corps. The funding wasn't the apprehension; the oversight was the apprehension.

Lisa Mighetto: And did that come to pass?

Rich Vaughn: My sense is in the jobs that I've worked with, especially with BPA, it has not come to pass at all, and there's a big sense of teamwork, much more than I had ever thought would develop in this type of thing. But it definitely, to me, has developed a team environment.

Lisa Mighetto: Is there anything else you would like to add? Are there individuals who stand out for you in terms of the history that I should be sure to talk to?

Lee Sheldon: Well, you're going to see Chester Scott this afternoon. You're going to see Paul Willis this afternoon. Chester Scott goes back near the beginnings of the organization, although he did have a predecessor. So by all means, give him my regards.

Lisa Mighetto: Okay. Rich, do you have any suggestions?

Rich Vaughn: One person that comes in mind who you won't be interviewing because he passed away a little while ago, but not necessarily from an engineering standpoint, but he was to several of us mechanicals he was sort of a mentor, but he'd guide us in the way it shall be done, and that was Jim Mooney. He was one of our technicians. But boy, you definitely learned the Mooney way of doing things when you started out here, you know. It was probably a good way to start out because you don't necessarily get that kind of strong, definite directional guidance on issues of how you prepare a drive.

Lee Sheldon: To show you what a small world this is, I rented one-half of a duplex in which Jim Mooney was in the other half, and the duplex was owned by Paul Willis.

Lisa Mighetto: So you guys were all working together at that same time?

Lee Sheldon: Yes.

Lisa Mighetto: So you basically saw each other at work.

Lee Sheldon: Night and day.

Lisa Mighetto: I was going to ask if that was a good thing. The other interviewees that I've talked to have said that this is a very close-knit group. Would you agree? I mean, you were pretty close since you were living with the people you were working with.

Lee Sheldon: In terms of association, yes, although I would have to say there are certainly differences of opinion. But closeness in association, yes.

Rich Vaughn: I think sometimes those differences of opinion are enjoyed, and I think within the organization are a lot of individuals who share a lot of things and a lot of time outside of work. It probably makes a difference on whether or not you want to stay here a long time, and those bonds that you create with other people.

Lisa Mighetto: Lee, did you see changes in the work culture in your time there?

Lee Sheldon: Can you be more specific?

Lisa Mighetto: Well, yesterday some people that I talked to said that they thought that the Customs House had a sort of more congenial atmosphere, and here they felt sort of lost in the district, I guess. And they also talked about how formal it was

initially, coming to work in – it sounded almost like a suit, and then later it became more casual in terms of dress.

Lee Sheldon: For myself, I find the present day working environment much friendlier than the rigidity that existed in the prior.

Lisa Mighetto: So you prefer the current.

Lee Sheldon: Very much so.

Rich Vaughn: I share some of the same feelings. I think earlier there were times in certain cases that when you made an important technical decision, it was not necessarily your own, and sometimes you had to get buy-in from people who were up above you, and it was more of a stove-piped organization there. And it was often when you were trying to do things quickly or efficiently, sometimes you felt a little held back in trying to work within that framework.

For example, in the HEDB days when you prepared specifications for equipment procurement and so on, those were sent back to Headquarters in Washington, D.C., for an in-depth review critique. You received the comments back to incorporate before you would advertise the contract and so on.

Now, there is no Headquarters review, there is no peer review. Basically, you do your own specifications. That change in rigidity, if you will, I think gives us more flexibility today.

Lisa Mighetto: That's interesting. Well, is there anything either of you would like to add? Well, thank you very much.



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INTERVIEW
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Interviewees: Chester Scott, Paul Willis, and Rod Wittinger

By Lisa Mighetto
November 18, 2004
Portland, Oregon

Lisa Mighetto: This is the HDC interview, Portland, Oregon, November 18, 2004. I suggest we start out by having each of you briefly introduce yourself. Say your name, when you started working for HDC, and what you did there.

Chester Scott: My name is Chester Scott, and I joined this office June 15, 1949, and I worked for 27 to 28 years, and retired January 7, 1977.

Lisa Mighetto: And what did you do here?

Chester Scott: I was head of the Turbine Design Section.

Lisa Mighetto: Okay. Rod, right?

Rod Wittinger: My name is Rod Wittinger. I started with the organization in November 1977; I'm still presently employed with the organization. I guess it's sneaking up on 30 years – soon to be 30 years.

Paul Willis: Paul Willis. I joined the organization in December 1973 and I retired in March 2001. I was a member of the machine design group and mostly the turbine group throughout my career.

Lisa Mighetto: And when did you become part of the turbine design group?

Paul Willis: In the 1970s just before Chet retired.

Chester Scott: Probably 1976.

Lisa Mighetto: So you two have worked together, then.

Paul Willis: We all three have.

Rod Wittinger: I never worked directly with Chet.

Lisa Mighetto: Because you retired in 1977.

Paul Willis: So only Chet and I have worked together.

Lisa Mighetto: Well, what do you think are the most important developments to affect HDC during your time here, things that we

should be sure to include in the history? Well, you've [Chester Scott] been here - I think it started in 1948, so you were here almost from the beginning.

Chester Scott: I wasn't quite the original organization.

Lisa Mighetto: Well, what was it like when you first got here?

Chester Scott: Well, let's see - for me it was kind of peculiar because while I was going to Oregon State, in my final year rather than take steam power engineering, I took hydraulic - hydroelectric engineering, and I needed permission from the heads of the civil department and the mechanical section to do that. And I was all set to go to work for the Portland District, but they had just finished what they called the "306 Report." This was an immense collection of projects that the Portland District and other districts had analyzed. And rather than being in a hiring mood, they were in a firing mood. So I was really pretty unhappy for about 24 hours until ... a fellow by the name of Bob Sterdevant [in personnel] learned of this, and also knew that this new office had been formed, and it seemed clear to him that my qualifications could probably be used in the new office.

And so I heard from Bob and he told me to go in and see the head of the Hydroelectric Design Branch, Bob Shupneck, and Larry Fisher, which I did, and I was subsequently hired, and really was very fortunate to get that job because the man that I worked for, unfortunately, died in about

six months and I kind of had to take over.

Lisa Mighetto: What was the size of the staff when you started?

Chester Scott: Oh, the size of the staff was probably - there was just myself and this other fellow that passed on, and in the structures I suppose - I'd say all total there's probably 80 personnel. That's my guess.

Lisa Mighetto: And was the office in the Federal Reserve Bank?

Chester Scott: No, the office was in the Pittock Block, on the fifth floor of the Pittock Block Building, and we subsequently moved to the old telephone building on Burnside, and then I suppose in about five years went into the Federal Reserve Bank building.

Lisa Mighetto: Is that because you grew in terms of size?

Chester Scott: Yes, well, the old phone building was a poor choice because there was no air conditioning, and they had these great big windows that they'd have to open. And you know what the traffic is like on Burnside. So, you know, on a hot August day, with the humidity high and the dust high, it would come in on the drawings. It was an awful thing to try and solve.

So I don't think we were there more than maybe three or four years.

Lisa Mighetto: Well, how about the rest of you? What do you think were the most important developments?

Rod Wittinger: Developments for HDC? I think the primary one for development was the definite separation - or the development area, of the various disciplines in the engineering, and that helped develop the expertise. And then another development that's occurred more recently is that it's been broken into a regional area, the developmental opportunities have been reduced.

Lisa Mighetto: You mean the three branches?

Rod Wittinger: Correct, in the expertise area, not in the customer service area, but in the expertise area, so that the ability of engineers of like flavor to communicate with each other and do development work and design work and follow advancements has been diluted quite a bit.

That's one of the developments. The other development, I think, that's been a major fact is the move from the division office to the Portland District, which has also diluted the perspective of the design center. And of course, being made a design center was an important element in our development.

Lisa Mighetto: Can you explain "diluted the perspective of the design center"?

Rod Wittinger: Diluted the perspective of the design center - by that I mean the search for qualified individuals isn't

as broad as it used to be with Portland District sitting at an administrative level above the center. The distribution of some of the managerial roles has been pretty much centered in the Portland District rather than in a broader perspective across the region.

I think there were some major elements early on with the completion of the major projects within the area and the region in the eighties, and the change in focus from heavy construction and new designs to more operation and maintenance, and repair and replacement. That has been a major change.

Also, along with those changes came the needs and the lack of needs for various disciplines. For example, when you're not building buildings, you don't need certain expertise, when you're only doing certain things. So there had been a reduction in staff, kind of automatic that resulted from that.

So, in my experience, the staff - when I joined, it was like it was about 121 when I joined, and I believe now it's about 85.

Chester Scott: Of course, the HEDB has changed completely since I retired. When I worked for the office, we were building new projects, and about the time I retired, then these poor folks had to start repairing some of the equipment I was responsible for.

Lisa Mighetto: What were some of the biggest projects you worked on?

Chester Scott: Well, horsepower-wise, I guess John Day was the biggest Kaplin unit, and then the biggest Francis was up on the Dworshak. We have a 350,000 horsepower there.

Lisa Mighetto: And you're saying when you left - did people realize when you left around 1977 that things were changing?

Chester Scott: Oh, sure. Yes. It was recognized that we were going into an area where they would be maintaining the equipment for some years. There were a few new projects that came up, but it was kind of few and far between.

Paul Willis: When was the Water Act passed that provided all the funding for the Columbia projects?

Lisa Mighetto: Eighty-six, the cost sharing?

Paul Willis: No, this was in the forties or something.

Chester Scott: Actually, it must have been before Bonneville.

Paul Willis: So in the early or mid-thirties. This is what really spearheaded the establishment of what we call a regional office in the Pacific Northwest. It was this water bill that passed through Congress, providing funding for the construction of waterway facilities.

The Corps of Engineers' mission is really navigation and flood control, and the power is secondary. But we have

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Because of environmental issues, funding issues, and we started putting together rehabilitation reports to send to Congress that were three to six inches thick. Just preliminary feasibility reports. It became quite a process; timely and expensive.

multipurpose projects, so we get involved in fish and recreation, navigation, flood control, power, and so forth. But it was that act, the passing of that, really initiated the establishment of the hydroelectric design branch.

Chester Scott: It was really what's called the 308 Report. And that was – Congress approved that and set it in motion, the preliminary studies to figure out which plants to concentrate on, and that's how our whole business began.

Paul Willis: And there probably isn't one Columbia River Project that he wasn't involved in, and even projects in Idaho and Montana.

Chester Scott: Well, I was involved in 22 projects.

Lisa Mighetto: How about you, when you came in 1973?

Paul Willis: In 1973, we were just starting the tail end of things. Things were tapering off. John Day was getting finished in the early seventies. I was out there on construction. But the big construction projects were running their course. They were being completed.

You had the smaller ones, you had the lower Snake projects – Goose, Granite, Monumental. There were just six units as opposed to 16 units and 27. And then there were Green, Peter, and Foster which were smaller ones. But you were still here for the smaller ones.

Chester Scott: Oh, yes.

Paul Willis: But then there was this shift from construction work to O&M work.

Chester Scott: We did at one time kind of serve as a . . .

Paul Willis: Broad review.

Chester Scott: No, but we used to hire them. They were outside engineering groups that would do parts of our work.

Paul Willis: AEs.

Chester Scott: AEs, right. And there was a period when we took over some of those plants from the middle of country. I don't remember names anymore, but there was that point that our office did. They acted as an AE to other districts that were involved in some projects. I can't think of their names, though.

Paul Willis: Now, was it more in a review status?

Chester Scott: No, I think we actually did some design on powerhouses and stuff, I'm pretty sure.

Lisa Mighetto: Is that why Portland was chosen when they consolidated them? You mentioned there were three – Mobile, Omaha . . .

Chester Scott: Yes, well, I think our HEDB really was larger than any of the other ones, and were more well known and what have you, and I think it was just larger.

Lisa Mighetto: Why were you larger? Is it because there were bigger projects out here?

Chester Scott: Yes, there were so many – so many projects within the period of, you know, 25 years. I was involved in 22 projects. That's a lot of projects.

Lisa Mighetto: So that would have been more than, say, the Missouri River would have, or Omaha.

Chester Scott: Oh yes. The Missouri River probably had maybe four or so. The Nashville District had quite a few. They had a pretty good group. And Mobile...

Down in the TVA area there were quite a few, yes. But nothing like what we were doing. Nothing like this.

Paul Willis: In terms of number of plants, number of units, and then capacity, we were the largest.

Lisa Mighetto: Okay, so that's why it made sense to locate it here.

Paul Willis: We had depth of expertise whereas the other places, through the years, through attrition, they didn't

Rod Wittinger: I guess one of the other changes that I've seen, recent – more recent than anyone kind of mentioned – it was 1986 – was the move to fund hydropower work, rehabilitation work, maintenance work through the power marketing agencies. In this region, BPA is now a major funding source, and that avoids the problems with the Congressional funding, and there is direction all across the

U.S. into the other federal power marketing agencies to also be able to do this to allow the plants and the machines and etc. to be rehabilitated and kept in service.

So that has been a very big boon to our organization, and having the ability to do that.

Lisa Mighetto: Was funding an issue in the early days? So it was congressional appropriations before it was BPA, right?

Rod Wittinger: Correct.

Chester Scott: I don't know anything about that.

Paul Willis: It was freer earlier, and then in the later seventies and early eighties things tightened up a little again. There were no appropriations for large projects. You had environmental issues and fish issues that came more to the forefront. This slowed things up, and then, as I mentioned, in the mid-seventies to the late seventies we switched to the emphasis on supporting O&M activities. We actually became somewhat dependent on O&M funding for our bread and butter.

And then in the eighties, projects now started to be 40 years old and 50 years old, and started requiring a look into rehabilitation. Because of environmental issues, funding issues, and we started putting together rehabilitation reports to send to Congress that were three to six inches thick. Just preliminary feasibility reports. It became quite a process; timely and expensive.

The first one we did was Bonneville Powerhouse. It started in the mid-eighties, and it was finally approved in the late eighties. The report was several million dollars, and the time was some five years.

Rod Wittinger: Before the funding was received, it was ten years, from the beginning of that report.

Lisa Mighetto: Ten years?

Rod Wittinger: Yes, because it had to do with three different times.

Lisa Mighetto: That's amazing.

Paul Willis: And we finally let a contract to do the work, I think it was in December 1993.

Rod Wittinger: No, it was a little later than that. Same time Dardanelle...

Paul Willis: Well, one was 1993 and the other was 1994 – pretty close. But those were our first major rehabilitation projects. And then after that, we started doing more. Now I don't know the number we've done, but . . .

Rod Wittinger: The whole process has changed because of the power marketing and funding. That teamwork where the power marketing agency and the districts and the HDC worked as a team to determine what should be rehabilitated and consensus reached on how to do things, and HDC executes the technical portions, and many of the inspection elements of that. But the process is a team

One winter, why, they got – the transformer overheated terribly, and so they shut things down and opened up the transformer and it was full of fish.

process where in prior years, where we would write specific specifications for a powerhouse, it was more prescription of the organization rather than a team – or a teamwork effort including lots of stakeholders in the development of the plan. So currently, or in the last ten years, it's been a large group of stakeholders having input into an overall plan.

Lisa Mighetto: And what's coming down the pike? Is there still a lot of rehabilitation work?

Rod Wittinger: There is a lot of rehabilitation work. We've scratched the surface of the need, and Bonneville is the first one that we are actually rehabilitating in this region.

Lisa Mighetto: And that was the first constructed.

Rod Wittinger: That was the first constructed, but the difficulties that have to be overcome are not so much technical anymore but political in that we have to deal with the environment and fish passage and all the safety concerns and health safety concerns that were never a concern in some of the original years. So this has had a big impact on how business is done.

Lisa Mighetto: Chet, were there environmental concerns when you left? Were you beginning to see that?

Chester Scott: I suppose, to a certain extent, yes.

Lisa Mighetto: But not to the extent that Rod is talking about?

Chester Scott: No, no, no. We didn't worry much about that. Nobody told us to worry about it.

Paul Willis: I think that if you see the early projects, even as early as Bonneville, there has always been an acknowledgment and a concern – of the concern and a deliberate action to do something about it. Bonneville has had fish ladders for the fish, both upstream and downstream.

Lisa Mighetto: And that's 1938.

Paul Willis: Yes. But now things are getting more sophisticated, but it's because of knowledge. It's just like any other field engineering. The more you know, or the more there's interest, the more you do research, the more you understand, the more you can do, and so forth within the state of the art.

Rod Wittinger: Hindsight is 20/20.

Paul Willis: When there was an issued raised, the Corps did some due diligence to see if they could do anything about it, if it was justified or not.

Lisa Mighetto: Did you all say you worked on fish passage facilities, or you're the turbine group.

Paul Willis: In general, fish facilities are the district's function.

Rod Wittinger: But the turbines are a fish-passage route, which we are working on.

Lisa Mighetto: In the minimum gap runner?

Rod Wittinger: That came out of our design. That was my instigation to try something that we didn't have. It did not make sense to put a turbine back in there that was identical to the original one. We knew better, that we could do better.

Lisa Mighetto: So your group initiated that?

Rod Wittinger: Yes, we did. We sent – sent the memo to the commander asking for the opportunity to do that, and the commander was Colonel Slussar, here in the district – Portland District, that agreed that it was wise and prudent to move ahead and try to improve, and so that's what we did.

Lisa Mighetto: And where are you in that process? Has it been created? Is it implemented, or is it still in the design stage?

Rod Wittinger: No, the machine is installed and it was successful. There's five of them installed at Bonneville – Bonneville I powerhouse.

Lisa Mighetto: And it worked.

Rod Wittinger: It worked. It passed fish better than the existing machine that was there.

Lisa Mighetto: And now are other projects looking at that?

Rod Wittinger: McNary is being designed specifically for improved fish passage.

Paul Willis: So that's a big change in the past. It was all the district, and then in the nineties with the change to look at equipment, then HDC got involved in that.

Chester Scott: Wasn't HEDB pretty much responsible for the fish screens too?

Rod Wittinger: Yes. We designed them. HDC designed.

Chester Scott: We designed all that equipment.

Paul Willis: Yes, but I'm not sure when the instigators were.

Chester Scott: But you know how that all kind of started. One winter, why, the transformer overheated terribly, and so they shut things down and opened up the transformer and it was full of fish. And they found that the cooling water was taken off of the fish passage – it was a fingerling handling fish passage that bypassed the powerhouse and went down to the tail race, and so during the fish passing situation, these fish were in there and they went into the cooling water of the transformer and just plugged it up. And, of course, there wasn't enough water to cool the transformer and it shut down.

Lisa Mighetto: When was this?

Chester Scott: Oh, gosh, I was still there.

Lisa Mighetto: So it was before 1977.

Chester Scott: I suppose it would be in the late sixties.

Rod Wittinger: What project was that?

Chester Scott: That was Ice Harbor. And then another thing – let's see, how did that come about? I guess that same phenomena, the fact that the fish were getting into that waterway. It led them – some of the districts then took a look at studying where the fish were really coming through, and in general the little fingerlings were just following the intake roof pretty much, and then coming down and going through the unit. But they could, of course, have access to any intake slots or any intake water passages. And so – what was I talking about?

Rod Wittinger: Fish screens.

Chester Scott: Fish screens, yes. So it was another reason that they got into the fish screens, was they knew the fish were coming through on the upper part of that intake. So then [we said] well, let's just put in a slant-like device that would divert the fish up into a passageway and take care of them that way.

Rod Wittinger: With a fish scoop?

Chester Scott: The fish scoop is what they had.

Rod Wittinger: Well, the screens, and they had the fish

There's a team forum called the Turbine Survival Program that is a regional group of Corps engineers that deal with issues of turbine passage, so it links the biologists, the hydraulic engineers with the mechanical engineers, so that we get a cohesive look at fish passage, and that includes national fisheries and some others, too.

scoop. They tried those different things.

Chester Scott: Oh, yeah, right.

Paul Willis: I think initially there was a Washington firm. I remember they did an initial design on a fish screen and it didn't work properly, and then we took it over, wasn't that it?

Rod Wittinger: I really don't know.

Paul Willis: It seems like the first ones they put in were done by somebody else, and we said we could do it better, and that's how we got in the business, because that really isn't something that we would normally get involved with. And so from then on we designed and were involved in fish screens.

Lisa Mighetto: And it sounds like you still are involved in fish-passage facilities to some extent.

Paul Willis: No. Facilities are the districts responsibilities.

Rod Wittinger: There's a team forum called the Turbine Survival Program that is a regional group of Corps engineers that deal with issues of turbine passage, so it links the biologists, the hydraulic engineers with the mechanical engineers, so that we get a cohesive look at fish passage, and that includes national fisheries and some others, too.

Lisa Mighetto: And HDC is represented on that team.

Rod Wittinger: Correct. We started the team, and there's another group called the Turbine Working Group that is another regional group that incorporates representatives from all over the U.S. I'm actually the chairman of that group that regularly meets here. So it's to share and not duplicate efforts in investigating fish passage.

Lisa Mighetto: And how long have you been leading that group?

Rod Wittinger: At least ten years.

Paul Willis: Rod is essentially HDC's fish person, relative to machinery.

Rod Wittinger: I'm a turbine guy, come on.

Paul Willis: Well, I mean, dealing with the fish, and fish passage, and Rod has been the lead on that for many years.

Lisa Mighetto: When you started working here, did you ever think you would be the fish person?

Rod Wittinger: No, I didn't. I had no clue of that type of activity when I started here. But it might be interesting to know that my secondary major in the university was environmental engineering, not heating and ventilation, but in environmental engineering. So it kind of fell in with that type of activity.

Lisa Mighetto: Well, are there other developments we haven't talked about - other

technological developments? I mean, obviously, the minimum gap runner is sort of a tweak on the design. Are there other technological developments that are significant?

Rod Wittinger: Well, I guess that's a good question. This is – yes, let's put it that way. But the thing that one must remember is in the times during the development phase of HDC or HEDB, there were specific tasks to perform, and there wasn't any real need for research and development types of works. It was all placed on manufacturing.

As we move past in time and the problems become apparent, we have addressed more of the research and development areas.

Lisa Mighetto: What are some examples of problems, other than fish? We've talked about fish.

Rod Wittinger: Well, some of those might be the bearings that we've gone through, the materials selection that we have gone through. There are various ones that we've done. The new technologies have provided us great opportunities to improve. Some things that I know Chet wanted to do way back when, we can now do with control systems. We are not limited by simple mechanical devices. We can go into three-dimensional types of examinations. 3-D CAM is an example. It's transformed from originally a two-dimensional CAM to a mechanical three-dimensional CAM, to electronic three-dimensional CAM.

Chester Scott: Oh, yes, right, that's interesting, sure.

Rod Wittinger: And that still had mechanical components to now, which we're implementing our digital governors which don't have mechanical CAM pieces in it, it is all electronic.

Chester Scott: It's just software, isn't it?

Rod Wittinger: Yes, it's software. And all of those types of things are being organized into global optimization of our system, and that is something that is new. We strove – the best we could do before in the early phases is what we call index tests – to make the best performance for an individual machine, and that was all we could do.

The present status is that we can now individually index test machines – or we're very near that point – on a global basis without having to perform real field tests, individual field tests, optimize each machine. We can optimize a plant. The BPA has joined the team and is now using that information, optimizing the river and an even larger basis with our other friends in the area of the Bureau of Rec[lamation] and the PUDs and some of the other areas.

There's now at least initial discussions going on regional power optimization – in other words, coal plants, wind, and optimizing the load settings on those to utilize resources. Those things were never dreamt of years ago, so we're –

The present status is that we can now individually index test machines – or we're very near that point – on a global basis without having to perform real field tests, individual field tests, optimize each machine. We can optimize a plant.

So we now have our castings or materials being produced in South America, Korea, China, in the Eastern Bloc – in Russia and the Eastern Bloc. So we specify an American standard, and you can almost bet that these people have never seen that standard. They're making steel.

Lisa Mighetto: You mean in terms of other forms of energy, or working with other agencies, or both?

Rod Wittinger: Working with other forms of energy and other agencies, and becoming a more united front with the inner ties being developed for power generation impact. It's interesting; Canada is selling their power in Mexico through the U.S. grid. That's kind of – some of those things are strange, but those are some of the new items that electronics has helped us considerably and the control features have helped.

Lisa Mighetto: Does that bring up security issues?

Rod Wittinger: Security – after September 11th – I don't think we have too many security issues. Our security systems at our plants are pretty high – high level. Have you been to a plant lately?

Chester Scott: No, but I was surprised the way I had to get in here.

Lisa Mighetto: What you have to go through to get in this building?

Chester Scott: Yes. I thought the guy was crazy, you know. What are you worried about? And I had just started the job, so he didn't know what he was doing and I didn't know what he was doing, so we kind of spun our wheels there for a while. But finally a lady came along and showed them what to do on the computer and I was there, and

somebody told somebody that I was going to come in at 3:30 and they found that. It took a while.

Paul Willis: Security has always been a concern, whether it's just somebody running through a gate after hours. Many sites have always had some kind of security – physical security. And the more we start doing things electronically and either send it by microwave or secured T-1 lines, whatever, we're concerned about firewalls, security. HDC developed the new data-acquisition system for implementation in the Pacific Northwest, and that was a big concern. Here we're telling the status of plants, of how units are going to be regulated, what are the maintenance schedules, etc. And this, in the wrong hands, could be an issue, but not only from a security standpoint but also because of deregulation.

You have people that are looking to see how many units you have out of service so they can manipulate prices because they know the Corps is not going to be able to supply this, at a given time.

Rod Wittinger: Marketing.

Paul Willis: Yes, a marketing issue. And we saw deregulation change how we did business with a lot of nonpublic type groups. We always try to be pretty free with information, being a public government agency. They generally were free with their information, and it was a great technical exchange for everybody. But then as soon as deregulation came.

But as Rod was saying, essentially the Corps of Engineers, our mission in the Design Center was to support or develop – develop existing new science or support existing science. And then, when we had to replace something, it was dictated to be replaced in kind. There couldn't be any improvements in equipment performance because improvements generally cost money. Well, we weren't in the business of making money. So as a result, when a turbine failed, or we were going to rehabilitate a site, the mandate was replace it in kind because that was going to be the cheapest fix.

And it wasn't until in the late eighties that we were able to get a better unit for the same price. We felt it was our responsibility as engineers and stewards for the public to maximize the resource.

We did finally convince Washington that if we could do it for the same money that they should let us write the specifications to do that. But then, as Rod said, the power marketing agents started doing some of the funding for rehabilitation, and, of course, they're all for getting the last bit of energy, which then translates into dollars out. And so now they're not only willing to let you specify more performance, they are willing to pay for it.

Lisa Mighetto: This is BPA, right?

Paul Willis: Yes. So there has been a big change here in allowing us a different way to do business. Before we couldn't,

and we were constrained. The way that we did improve on equipment and help the industry at large was by participating in industry associations. We would become members of electrical associations, mechanical associations, or Electric Research Power Institute (EPRI), or working with Department of Energy (DOE) and their power group. We would have a seat on those committees so that we could give our input.

Chester Scott: And this has all been done since I retired. It may have been starting when I retired.

Paul Willis: It really started ballooning in the early eighties when we started getting more involved in that with industry and . . .

Rod Wittinger: And we're even moving to the international region right now.

Lisa Mighetto: So you're moving to the international?

Rod Wittinger: Right. I am a member of several international committees that deal with hydropower. The manufacturers available to us in the United States now are zero for our turbine work, for turbines of the size we're dealing with. They're all international. They all deal with international standards and not United States standards.

It would seem prudent, and it has been prudent, for a representative from the United States to be involved in international standards to

better update or better utilize the standard system.

Lisa Mighetto: What are the other nations involved?

Rod Wittinger: It's worldwide. The main – you know, most of the turbines now – manufacturers – Canada, Austria, France, Germany. We have a manufacturer in the United States but it's a foreign manufacturer in York, [Pennsylvania], and we have one American manufacturer, American Hydro, but they don't make the machines – they don't yet make machines of the size that we deal with.

Chester Scott: This is what, American Hydro?

Rod Wittinger: Right.

Chester Scott: Oh, yes. They're pretty small potatoes, aren't they?

Rod Wittinger: On the scale of the industries, yes, but they could do the job. We've supported them as best we can. But they're a little bit smaller organization. So we now have our castings or materials being produced in South America, Korea, China, in the Eastern Bloc – in Russia and the Eastern Bloc. So we specify an American standard, and you can almost bet that these people have never seen that standard. They're making steel.

And so getting on to these broader committees and trying to normalize things is – we're just beginning to do that, just beginning to do that. We have a world market we have to deal with.

We used to have to review the model tasks, and that involved whoever got the job, and there are turbine manufacturers all over the world. I got to Sweden and Japan and back East, of course, quite a number of times. So it really was a very interesting job.

Lisa Mighetto: That is an interesting development.

Paul Willis: Rod can elaborate on HDC changes. Where money again is drying up for a project – maybe you can elaborate on that.

Rod Wittinger: Well, as a total for HDC, the funding streams that we have in the past gotten from our Headquarters or through the government offices as the shift, as I described earlier, to the power marketing groups has really cut back on the congressional appropriations in the thought process being, I believe, of the congresses that we built and the public paid for these. Now, the power marketing agencies marketing the power should be the one taking care of those items.

And so, right now, the funding level has been pretty decent for this region, but for the total of the HDC where the other power marketing agencies have not received the authority to do that, the direct funding from Congress through the other Corps of Engineers off-groups to get to HDC has slowed down dramatically.

I can give you an example. Currently, the congressional funding, CRA, is continuing resolution, so – and this has been going on for years and years. We always have this problem where at the beginning of the year the Congress has not approved the appropriations for that particular time, and time drags on until November, December, January, and then suddenly they approve

this and they've got this big change in it. A lot of dollars to expend, but one-third of the year has gone by when you didn't have any money to do anything with. So now you're forced to crash into a program to try to expend the funds and utilize those funds in the remaining time.

The CRA, as it's called, has been a continuing problem, will continue to be a problem.

Lisa Mighetto: Sounds like in other regions more than here.

Rod Wittinger: Yes. That is correct.

Paul Willis: But even before that, during last year, the funds – money streams from other districts to support the regions in the Atlantic and the Central have dwindled off considerably.

Rod Wittinger: Well, that is true, Paul. The primary reason that that's happened is this country is involved in a lot of other activities, and we've had some disasters and some failures and some international events that have –

Lisa Mighetto: Diverted funds?

Rod Wittinger: . . . diverted funds to other important needs.

Lisa Mighetto: Well, are there other developments that we haven't talked about that we should be sure to include in this history?

Paul Willis: I think one thing is that there has been a great staff of people that they've had to draw from.

Rod Wittinger: Excellent engineers.

Paul Willis: Yes. They've been very fortunate. Hydropower is a unique field, and there aren't a lot of people that go into it, and it's a pretty small community. But HDC somehow through my career of 30 years, has always seemed to get very qualified – not only qualified technically, but very personable people. People that have been concerned with only the technical community, but also the communities they live in. They are concerned for their fellow workers, and the programs that they put together to insure people are taken care of, and various plights they may find themselves, whether it's the death of families, or sicknesses, or whatever. It was very touching throughout my career to see that. And it was consistent.

Lisa Mighetto: Throughout your years here.

Paul Willis: Um-hmm.

Lisa Mighetto: Would you agree, Chet?

Chester Scott: Oh, sure, I'd agree. You bet.

Lisa Mighetto: It seems like a close-knit group. Well, is there anything you miss, or what do you miss the most?

Paul Willis: Well, I can honestly say that I enjoyed the 30

years. I looked forward to coming to work, and there was always a challenge. There was great variety, and again, the people that you worked with were from a technical standpoint and from a personality standpoint a great, fun, good-natured bunch, and I never begrudged a day.

Lisa Mighetto: Good comment. This is Chet.

Chester Scott: The thing I'd like to remark about is that on a given project, I was really involved from the very beginning to the very end, because a lot of the districts needed my help in determining turbine characteristics and costs so they could look at different numbers of units and that sort of thing. And, of course, that's all way before we really would get into our work here.

And then, of course, there is a lot of work in writing specs, and reviewing drawings, and helping the project as it was being built, and then finally, we'd have to go out and test the units. So I really got involved in the whole scope, you know, rather than somewhere in the middle or near the beginning or end. Don't you agree?

Rod Wittinger: Oh, definitely.

Chester Scott: You know, we really got involved in many years of the same project, which made it very interesting. Yes.

Paul Willis: And I guess the other thing is the expression, join the Army and see the world. Well, I've traveled most of Europe and

Asia, some of South America on Uncle Sam's dime, working for the government.

Chester Scott: We used to have to review the model tasks, and that involved whoever got the job, and there are turbine manufacturers all over the world.

Lisa Mighetto: So you traveled a lot, too.

Chester Scott: Oh, yes. I got to Sweden and Japan and back East, of course, quite a number of times. So it really was a very interesting job.

Lisa Mighetto: Is there anything either of you would like to add?

Paul Willis: No. Retirement's great.

Chester Scott: Right, yeah. The job was fine, but the retirement is pretty good, too.

Lisa Mighetto: Well, thank you all.



Chester Thurston Scott



A memorial service will be held Aug. 3, 2005, in Westminster Presbyterian Church in Portland for Chester Scott who died of cancer July 19, 2005, at age 83.

Chet was born Oct. 30, 1921, in Portland. He graduated from Grant High School and attended Oregon State University for one year before serving over three years in the Army Air Corps during World War II as a propeller specialist. After the war, he completed his education at OSU and graduated as a mechanical engineer in 1949.

Upon returning from the war he joined the US Army Corps of Engineers. For 25 of his 28-year career with the Corps he was head of the turbine design group of the Hydroelectric Design Branch, North Pacific Division. He became an expert in the field of hydraulic turbines and played a major role in the design and development of 22 hydroelectric projects in the North Pacific Division. His contributions to the John Day Powerhouse, the largest powerhouse with the most powerful turbines of the time, resulted in a Presidential Citation, and after retirement he was appointed to the US Army Corps of Engineers Gallery of Distinguished Civilian Employees. He was active in the hydropower industry with various consulting firms for many years.

He enjoyed making and repairing things for his family and friends in his complete metal and woodworking shop. His classic 1939 wooden cabin cruiser, the NOIBN, was a familiar site for 33 years cruising and fishing in the Columbia and Willamette Rivers and off the mouth of the Columbia River.

Chet will be remembered by all as a kind and generous man of great integrity. He will be greatly missed by his family and friends.

Survivors include his wife, Lorraine; son, Gregory Chiodo; daughters, Sandra Chiodo and her husband, Harry DeTurk; Christine Austin and her husband, Ed; Leslie Orr and her husband, Dave; seven grandchildren and four great-grandchildren.

Private interment. Remembrances to Audubon Society of Portland.



Al Hoadley, Mark Ohlstrom and Paul Willis at Hitachi Model Test Lab, Japan, 1989.



Paul Willis at VA Tech Lab, Austria, for the Lower Granite wicket gate inspection.



HYDRO
ELECTRIC
DESIGN
CENTER

INTERVIEW
10

Interviewees: Philip Davis, Dick Moore, Jack Nelson, and Glen Woodward

By Lisa Mighetto
November 19, 2004
Portland, Oregon

Lisa Mighetto: This is the HDC interview, Portland, Oregon, November 19, 2004. I suggest we start out by having each of you introduce yourself, say your name and how you came to work for HEDB/HDC, and what you did here.

Philip Davis: Okay, I'm Philip Davis, and I started working here at HDC in 1976, but it was HEDB back in those days – Hydro Electric Design Branch. I had just completed my classes at Portland Community College and was looking for a job, I just happened to land a job here as a file clerk. They started me out as a file clerk to get me in the door, and then they finally picked me off the register and I got hired on as a draftsman. And back in the days when we had manual drafting and ink and did it the old way, I took classes and went to night school and eventually became a technician. And now I'm an engineering technician, but mainly I do CADD work, Computer-Aided Drafting and Design.

I've been here since 1976, so that's 28 years now, and it's been quite a growing experience. I've seen and done a lot of neat things, and it's been really nice working here. I love all the folks that I work with, great group of people.

Glen Woodward: I'm Glen Woodward. I was hired in 1977 as an engineer-in-training (EIT). I ended up basically working in the power subsection for 28 years, until I retired in April of 2004.

Lisa Mighetto: April 2004?

Glen Woodward: Yes, 2004. That's about it.

Dick Moore: I'm Dick Moore. I started in July 1962 as a GS-9 electrical engineer. I moved from Boise, Idaho, and I needed a job to support myself, and I got the job after a number of interviews around town. The job announcement was at the state employment office. The job announcements come from the government.

Anyway, I started out laying out drawings for Lower Monumental Powerhouse and continued working in the power subsection until I retired as a supervisor in January 1996.

I have seen a lot of changes in those 34 years. Most of it was dress (shirts, ties, and jackets) and also technology.

Lisa Mighetto: We'll talk about that, too.

Jack Nelson: Okay, I'm Jack Nelson. In April of 1974, I was living in Corvallis and had a large family to support, and I was desperate for work and ended up coming up here to Portland to work for the Corps of Engineers. And so I said, "Well, I'll give it a few years and then maybe look around for another job."

So, that lasted until 1998 when I retired. But I came on as a GS-7 electrical engineer for the year, and then the training program, started working for the power section. I worked in what they called "medium voltage equipment," and I pretty much concentrated on that, with a few exceptions, throughout all the time I worked.

Then we finally reorganized and became the Central branch, but we did the same kind of electrical work until I retired in October of 1998. And go on from there, I guess.

Lisa Mighetto: Well, two of you talked about being in the training program, Engineering-in-Training. We haven't talked much about that so far in these interviews, so I wondered if we could start out by talking a little bit about that and how it works.

Jack Nelson: Okay, well, when I started they had a new revised program under the directorship of Lowell Hadley. And so the previous training was about a year and a half but they cut it down to about a year, and it amounted to spending

brief periods in a lot of different places throughout the local organizations of the Portland District and North Pacific Division, and then spending larger periods of time working for different groups among the HEDB is what they called it then.

Lisa Mighetto: How did you get into an Engineering-in-Training program?

Jack Nelson: Well, it was just something that all new engineering employees did. You start at the levels – like anywhere from a GS-5 through a 7 would be considered a trainee, so they started me as a trainee. And basically, it's just to get familiar with the Corps and its position in the hydroelectric design world or locally.

Then we would spend several months out at a project during construction and learn how the construction took place in the Corps, which is a bit of enlightenment. It would be about a four-month tour on construction, and the rest of the year was spent in different offices. Sometimes you would go to two or three or several offices in a day, and just talk to people for a few hours and move on. Other times you'd spend a few weeks, depending on how important it was going to be to what you're doing after that.

So, a couple of years later the program was about the same when Glen came on, so maybe you can enlighten us more on it.

Glen Woodward: I had kind of a unique experience because

when I was in the field the guy I was working for died, and I ended up spending nine months at Lower Monumental during the construction of the last three units. So, it was a good experience. I probably spent more time in the field than anybody else we know of. I kind of hated to come back.

Lisa Mighetto: Yes, I'm sure they were grateful for your presence.

Glen Woodward: Well, they seemed to be. They probably didn't realize what they were getting.

Lisa Mighetto: Well, what do you all see as being the major developments affecting HEDB and HDC?

Jack Nelson: One thing that was kind of subtle – during the past, you know, as I think HEDB started around 1949 or something like that –

Lisa Mighetto: 1948.

Jack Nelson: Well, 48, OK. So, then up through all that period and up through the seventies and I guess into the eighties, the leadership, the chief of the branch had always been an electrical engineer. And at one point they abandoned that idea and things started going downhill after that because the whole branch – Hydroelectric Design Center or Hydro Electric Design Branch, whatever they called it, was oriented toward electrical design, even though it was structure of powerhouses and all the mechanical support

systems. But the basic product was electrical generation.

And so it would have been preferable to keep that in mind, you know, during the administration of the branch.

Lisa Mighetto: When did that shift occur?

Jack Nelson: Oh, probably the early nineties or something when Curt Faulconer became the chief, whenever that was.

Philip Davis: The 90s

Jack Nelson: And so he was a mechanical engineer, and actually things had begun to decline a bit before that, when Glen Meloy was the chief because he was really poor. The problem is that engineers generally make terrible administrators because they get into the field for motivations of their own, and it's usually not involved with people skills. We're more kind of nerds, you know. So, that's always a problem.

But still, if you're going to have an engineer as a chief, I think it would have been preferable that it was electrical. So, things really did get less oriented toward producing electrical design as time went on, and there got to be more paper shuffling, which you might as well admit is brown-nosing the customer. So, our production declined, I think, about that time. And that, I think, is a significant change.

And another, while I'm at it, another significant change is that we used to spend a lot of time checking our work. One person would do some work and another person would check it, and the checking declined, too. So, we would do something in a hurry just to get it out, without it having been properly checked, and it would be full of mistakes, and sometimes it would be designed by outside consultants, and still we didn't check it. And so there were a lot of errors that went out the door, and that was undesirable, too. We had a good reputation to uphold, and I think we were letting it down.

Dick Moore: When I first came, Bob Schutnecht was the head of the branch and Larry Fisher was electrical. He oversaw the power section and the control section, and the fellow that I worked for, Walt Russell. There were a group of four supervisors; Walt Russell, Bob Krahn, Elmer Strudall, and Bill Kohler. We would lay out the drawings, and Walt Russell would look them over. A draftsman would draw them up with pen and ink, and then all the printing and review. They would be reviewed and Walt would review them. The 10, 15, 25 drawings would go in and Larry Fisher would look at them, and he'd eventually find a couple of mistakes and he would circle them in red, bring the drawings out of this office and say, "Check 'em over again. I found a mistake. There must be more."

So, Walt would give them back, and we would spend a lot of time reviewing. There were 20 people in the power

The problem is that engineers generally make terrible administrators because they get into the field for motivations of their own, and it's usually not involved with people skills. We're more kind of nerds, you know.

One phone was for the four GS-13s that sat together in the power section. The other phone was for 15-20 people, and you didn't dare talk on that phone.

section at one time; engineers, draftsmen, technicians. There would be minor mistakes, and we would go through the process of correcting them and trying to catch misspelling, lettering that was improper, and really pick the drawings apart before they went out the door. It was a major event when we got a contract out the door. All the prints were done, real tracings were done and signed and that was it.

Later on, as Jack said, it got more lax and more lax, and some of the drawings were never looked at, and they just signed their names and sent out the door.

Lisa Mighetto: Why was that?

Dick Moore: They had control. Bill Schutnecht was a quiet man. Larry Fisher would come out and just lord over the people. It was almost like the guy's coming out of the glass office, so we all better keep our heads down. He might speak to you.

And then, of course, Walt Russell supervised the power section. We had two phones for 20 people. One phone was for the four GS-13s that sat together in the power section. The other phone was for 15-20 people, and you didn't dare talk on that phone.

Lisa Mighetto: Who talked to the customer?

Dick Moore: Walt Russell talked to the customer and any salesmen that came in. If he'd see you talking on the phone

he would come over and walk around to where he could look at you. You'd turn your back and move around, and pretty soon you would not be saying much, and finally just hang up. He would say, "I hope that wasn't a personal call." That was the way they did it.

Lisa Mighetto: You started out talking about reviews and how the work was reviewed very rigorously, and then it wasn't.

Dick Moore: Yes, over a period of time we got more work than we could handle. We agreed to do more work than we could handle.

Jack Nelson: Yes. They wanted to build up their influence in the Corps, you know, and be the top design center. There were other centers too . . .

Glen Woodward: Omaha and Mobile.

Dick Moore: - anyway, we took on too many dams.

Lisa Mighetto: So, there simply wasn't time for this kind of review and oversight of employees?

Dick Moore: Right. And then when they brought the AE programs in to do the work, Architect /Engineers.

We gave them a contract, and initially they would use the same rules as the military used for hiring the contractor, and you had these forms that the contractor had to jump through hoops in order to get on the bidding list,

and they had to specify the name of the agents, the serial number of every person they employed, and we'd have a conference and these people would come in . . . paper and you'd look down and see names on this guy, and same name on this guy.

So, they would get the job from the Corps by saying these people worked for them. Well, they actually didn't until they got to work, and then they would -

Lisa Mighetto: Hire them.

Dick Moore: - and there would be ex-Corps employees or retirees. And that's when we just didn't have time to review their work. But after all, they were professionals.

Lisa Mighetto: Were there significant problems that stand out as a result of this, like an example? Something went awry because it slipped through with no review?

Dick Moore: No, I think there were just a lot of minor glitches. They didn't have the detail on the drawings that we had when we had all the time to do it. They would say, "dimensions left up to contractor." Let the guy build it - decide where to mount the equipment on the wall. We used to show very detailed installation drawings - down to the inch.

Jack Nelson: One of the results is that when something was designed and sent out under contract to be built, and if the design documents weren't properly prepared, then you'd

end up with the contractors not knowing exactly what to do and they'd either have to make their own decisions, or they'd say, "well, this is going to cost you more," and invariably that is what would happen. It would cost a lot more out in the field. The construction would go into all cycles of confusion and last minute redesign and changes and change orders, which were changes to the contract, which would cost quite a bit.

Lisa Mighetto: And did that affect the budget?

Jack Nelson: Sure. Yes, because the jobs would end up costing quite a bit more. Like, oh, invariably, you know, some of the major construction jobs - not all electrical design but structural as well - could end up - something that might have started out \$200 million might be \$400 million by the time it was done.

Lisa Mighetto: Twice as much.

Jack Nelson: Yes, easily. Not twice as much all the time, but sometimes.

Glen Woodward: I don't remember an A/E contract going right ever. That just didn't happen that I'm aware of.

Lisa Mighetto: From the seventies on?

Glen Woodward: Yes, from the seventies on. I mean, I had only been here three years when I realized that we were actually the experts. We were.

I had only been here three years when I realized that we were actually the experts... We'd laugh about it. We'd look around at others and find out we really were the most qualified, and yet we weren't able to spend our time doing design because we were all busy administering the A/E contracts, or trying to repair the damages of other poorly designed contracts.

...when they were building Lower Granite powerhouse, you know, basing a lot of the design and construction on what they had done at Little Goose, someone came up with a really neat phrase – “What’s good for the Goose is good for the Granite.”

Jack Nelson: We’d laugh about it. We’d look around at others and find out we really were the most qualified, and yet we weren’t able to spend our time doing design because we were all busy administering the A/E contracts, or trying to repair the damages of other poorly designed contracts.

Lisa Mighetto: And why did that change? I mean, why would that shift?

Jack Nelson: Well, in government or in any large organization, they have budgets and everybody is worried that if they don’t spend the money they have now, they won’t get it next year, or if they don’t make huge claims for the money for next year, they won’t get it. And so they’re always asking for a lot of money to get something done as early as possible because they’re afraid that the well might dry up.

So, if they see a flood of money coming in over the next couple of years, it just looks pretty good if you could spend it. And the pressure is on you to spend it. In order to do that, you have to hire people, award contracts, do designs, and get the whole works done in a shorter period of time than it would if someone had stretched it out over ten years instead of two or three years. But that put a big strain on design manpower, and the results are what we’re talking about.

It’s just the urge – the tremendous urge to spend the money now that you think you have.

Lisa Mighetto: So, that wasn’t the case early on. I mean, this is all –

Dick Moore: I don’t think anybody worked overtime – very few people initially when I came to work. We didn’t have that much work. They had finished the design and were building John Day powerhouse. Then they started on Lower Monumental and then Little Goose and Lower Granite. Lower Monumental and Little Goose, in fact Lower Granite were all copies of John Day as far as arrangements of the turbine generators and all the electrical equipment. So, as John Day progressed and they found any design errors, they could go back and change the design on Lower Monumental or Little Goose before it went out the door and got built. There were a few years that they had a lot of – well, not leisure time. We were always busy, but it ran smoothly even with the review time and making last minute changes to get the contract out the door.

Then as we got more into A/E contracts, like Jack said, we administered the A/E contracts. We’d go to the meetings and tell the contractor that they couldn’t do certain things, “we do it this way,” and they’d say, “Well, we do it this way,” and design and review methods just changed.

Lisa Mighetto: It sounds like they were doing the work, too.

Dick Moore: They were doing the work, and we were reviewing and approving or disapproving it.

Lisa Mighetto: And overseeing it.

Dick Moore: We were forced to accept their work by our management because the A/E was "professional" and maybe because the A/E was an ex-manager (retired HDC employee).

Jack Nelson: When you open up an A/E contract, there's a work order. You tell them in some sort of loose terms what you want them to do, and give them as much liberty as you can, but they have to produce it according to our standards. So, if we don't define that well enough, they have their own budgets. We say, "Well, if you do this work, we'll pay you so much." Okay, well, when they ran out of money paying their own employees, they just withheld whatever they got. They wouldn't give it to us.

And then if we start bickering about it, saying "No, you need to spend some more time correcting this," they'll look at all the inadequacies, the poor wording in our work statement and they'll say, "Well, you didn't tell us this, you didn't tell us that," you know. So, that would run into problems and sometimes we would have to -

Lisa Mighetto: They'd ask for more money.

Jack Nelson: - sometimes we would have to agree. We said, "Yes, I guess we didn't define this strictly enough here." So, even though you're wrong, we can't afford to pay you for it. So, that

would be some of the weaknesses of the A/E process.

Dick pointed out the fact that Lower Monumental, Little Goose and Lower Granite were clones of John Day. Lower Monumental was different, but Little Goose and Lower Granite were a lot like John Day, and Little Goose was built first, and then Lower Granite.

Lisa Mighetto: In the seventies.

Jack Nelson: Yes, and then the first three units, they are both six-unit powerhouses, and then later on they added a second three units. But when they were building Lower Granite powerhouse, you know, basing a lot of the design and construction on what they had done at Little Goose, someone came up with a really neat phrase - "What's good for the Goose is good for the Granite." You may remember that.

Lisa Mighetto: No, I haven't heard that.

Jack Nelson: Okay, I wanted to get that on the record. That was cute.

Glen Woodward: That's in our books.

Jack Nelson: Yes, it's in the books.

Lisa Mighetto: Well, are there other developments that we haven't talked about?

Glen Woodward: Well, I think the worst thing that ever

happened to HDC is when they split us into Central, Atlantic, and Pacific Branch. That made three little mini HDCs with not a whole lot of expertise in any of them, and that happened in '98.

Jack Nelson: No, about '96 or '97. We had existed as the geographic district region for here before coming to the district.

Lisa Mighetto: So, you were here?

Glen Woodward: Oh, yes.

Lisa Mighetto: And you were here?

Jack Nelson: We were all here.

Glen Woodward: We were all here except for Dick.

Dick Moore: I wasn't. I did retire just before they changed.

Glen Woodward: I think that's part of what triggered it - you left.

Jack Nelson: I'd like to comment on that a little bit. I think it's a healthy administrative change to actually have divided our activities up into geographical branches, but one of the problems that Glen was thinking of is that we still had to maintain professional expertise within our fields, like electrical. So, before we had an electrical chief who would be responsible for all of the design among all the different branches of different subsets like the power section, etc., so he had nominal responsibility. But once we had

it divided up into branches, the fellow who was supposed to have been responsible for electrical design, Richard Nelson, became the chief of the Pacific Branch, and the chief of the Central Branch, which I was in, was a mechanical engineer, and the chief of the Atlantic Branch was a mechanical engineer.

So, that got confusing. So, you're supposedly reporting to people with two hats, but there was no one person who was responsible for the electrical - correctness of the electrical design in the Central Branch, for instance. Every electrical engineer was on his own, and there was nobody to hold him to the line, and I think that's what Glen was talking about.

So, we still should have maintained some kind of professional accountability within your own profession, but that completely disappeared, and I hate to say it, but Richard Nelson, he really dropped the ball on that. He should have assumed the responsibility and taken a more forceful role, but he didn't think much about it.

Lisa Mighetto: I've heard people say that they didn't talk to each other in different regional sections.

Jack Nelson: Right. And we had prepared standards on how to design at least the power section's aspect of electrical design, and we were trying to keep them distributed among the branches, but that just sort of fell apart, too. People could have looked at these documents and

said, "Oh, let's do it in accordance with this and everything will be fine." But that was all ignored.

So, that was a major change. Glen's right - it turned out not as good as it should have been. Although the basic idea was sound, it just wasn't fully implemented.

Lisa Mighetto: And how was it addressed? Has it been?

Glen Woodward: No.

Lisa Mighetto: So, it's still an issue?

Philip Davis: It's still an issue. That I can tell and they aren't doing anything to really address it. It's still that way, and I don't know why but they're not that I can tell, and it's quite a problem sometimes. At times it causes stress between people.

Philip Davis: Yes, that's true.

Lisa Mighetto: And why is it stressful - because of the lack of communication and the lack of cohesiveness overall?

Jack Nelson: We all want to do a good job, but if we're not allowed to, if there's some constraints that prevent us from doing a fully effective job, we'll feel sort of ashamed of what the result is, and that's stressful. Everybody wants to do well, but if you can't, it's like beating your head against the wall.

Lisa Mighetto: So, I'm just trying to understand this constraint, because you're

broken up into regions rather than being divided, or grouped by disciplines?

Jack Nelson: Well, if in the Pacific Branch the chief is an electrical engineer, normally he should be able to oversee the electrical part of the design. But his background is more electronics, you know, communications, computers and things like that. So, he doesn't really have a good, continuous background in power-type design. So, even he is not capable of doing a good job of supervising the power aspect of the design.

Lisa Mighetto: So, it limited the expertise in each region then?

Jack Nelson: Yes. And he had a good man who was really aware of all the problems for major electrical equipment, Mark Pierce. But Mark learned to stick with his own field, which is wise, because that made him feel better about things. So, even he couldn't take the time to oversee a lot of the nuts and bolts of powerhouse design, as basically the Power Section did.

So, there's nobody keeping an eye on it all. And then there are a lot of people that came in new and they weren't getting full leadership. So, some of their mistakes weren't getting corrected, and some of the directions they were going towards were not being redirected towards things that were proper for the branch. So, it became frustrating. You couldn't guarantee the quality. We

wanted to take pride in our work, obviously.

Lisa Mighetto: Well, you mentioned a lot of people were coming in new. Many interviewed have talked about sort of the infusion of new employees...

Jack Nelson: I hate to hog the conversation, but we have gotten some really high quality new employees. On the whole they have been – there have been some duds, but on the whole they have been really good. Surprisingly enough, you wouldn't expect the government, with all the drawbacks, would attract that, but we got some excellent people. But you've got to keep them directed in the right direction, or else they'll fall apart.

I don't know, the government has some advantages, you know – job security. The pay is usually poor, but the work is fascinating. A lot of what we have done is comparable to building the pyramids, and that kind of grabbed hold of you.

Dick Moore: One of the things that I enjoyed was the office designed something, laid out the drawings, got all the details designed then the contract went out the door. The contract was awarded and you could go to the project in a couple of years and you could see what you designed being built, and actually have a feeling that you had accomplished something because here's the work we did in the office, and here's all the details, including the 480-volt outlet that

they put in the administrative office.

Lisa Mighetto: The what?

Dick Moore: The initial design had this office not as an administrative office but as an equipment storage room. I think it was Lower Monumental. We had a 480-volt outlet for a welder or some large piece of equipment installed in the wall, and when somebody went on a walk-through inspection, here's the desk with the typewriter and a young women sitting there, and here's this big electrical outlet in front of her. Well, it was a change. They changed the floor plan after the design went out the door. That was how we sort of discovered our design flaw.

But that was the main – one of the main attractions. To me, what made it enjoyable was the fact that you could design something and see the pros and cons, and see how it was built, and have a feeling of satisfaction.

Lisa Mighetto: And has that feeling continued to the present?

Glen Woodward: Yes.

Jack Nelson: . . . in the world of repair, still results in visible changes that we could point to and say yes, I did that. Like Glen was important to a lot of cranes. Maybe the cranes themselves may have changed, but the control packages, you know, were all different and he's done a lot of that. He can go up in the control cabin and say, "Oh, yes, that's all my design there."

One of the things that I enjoyed was the office designed something, laid out the drawings, got all the details designed then the contract went out the door. The contract was awarded and you could go to the project in a couple of years and you could see what you designed being built, and actually have a feeling that you had accomplished something....

But initially no working-level engineer would talk to BPA without a higher-level engineer involved. It would be in the front office that they did this. They would have a meeting and everybody had the coat and ties on, a rather formal thing.

Glen Woodward: Even if it doesn't work.

Lisa Mighetto: Well, are there other developments that we should be sure to include in the history?

Jack Nelson: Yes. We do a lot of coordination with other agencies. You know, like across the river is Bonneville Power Administration. Their national headquarters is here in Portland. And so that often resulted in a kind of an easy accessibility to their higher order of people. So, we'd design the powerhouse and we'd design the high voltage equipment up to the transmission line, and then the line would feed Bonneville Power from there. But we would have to talk to each other about the overlap. There would be more than just a nominal dividing line overlap.

So, we had to get together with the folks, their engineers and our engineers, and we would do a lot of coordination, because we wanted things to fit when we put them together, everything be the right size. And, of course, they've had their problems, too. They've had a lot of administrative shake-ups. Their design people have been cut back. They were rushed – they had to farm out a lot of work. So, our coordination between BPA and us had sort of suffered a little bit too. But a lot of the close relationships were dissolved because some of the people you talk to had retired, or leave, or got transferred, got laid off or whatever, or went somewhere else.

Lisa Mighetto: How did you coordinate? Did you go there for in-person meetings? You said you had one phone for 20 people.

Dick Moore: That was earlier on.

Jack Nelson: About the time I came to work that started changing.

Dick Moore: The number of the phones was how things were controlled in the office during those earlier years. We were in the Federal Reserve Bank building on the third floor, and as they moved to other locations, they got more generous with their furniture and equipment. We got rid of some of the old 1930 drafting tables. We got better furniture and we got a few more phone lines. That was how things evolved. But initially no working-level engineer would talk to BPA without a higher-level engineer involved. It would be in the front office that they did this. They would have a meeting and everybody had the coat and ties on, a rather formal thing.

Lisa Mighetto: Well, you mentioned that earlier, everybody wore coats and ties, even just to sit at your desk, I heard.

Dick Moore: We wore ties – engineers wore a coat and tie. Bob Miller, a technician did and some of the draft people wore dress shirts and ties. As time went on, the people would show up in sport shirts and things, but most of the engineers had a coat and tie, or at least a tie and dress shirt.

Lisa Mighetto: Was that required?

Dick Moore: In the fifties and early sixties if you wanted to get along with your boss or impress him you dressed as he did. The managers and supervisors all wore coats and ties. Some of the draftsmen didn't, but some of them did. It's just the way things were, you know, the fifties and sixties, "Dress for Success."

Lisa Mighetto: And Glen, you mentioned when you arrived in the seventies that's not the way it was; correct?

Jack Nelson: I was hired in April of 1974 and Dick's right, when I interviewed I didn't wear a tie. I just wore more casual clothing. So when I went to work, I came to work without a tie, and I had a beard. Everybody was clean-shaven, maybe a few moustaches. So, I came to work without a tie, with a beard – with hair on my face, you know, and after a while the ties started disappearing and people started growing hair on their faces. So, then it kind of got more casual after that.

At one time, one of the draftsmen, Harry Jones, he was really interesting. He'd always wear kind of a grubby looking t-shirt, and he had long hair, and was kind of lanky, dirty, greasy looking. He chewed tobacco and he would spit in the wastebasket. So, he was kind of the rebel. So, everybody else was neat – all the ties and shirts and everything. But in '74 it kind of declined, and

Glen might be able to comment on that some more.

Glen Woodward: Well, it was pretty casual when I started in '77. I never wore a tie. I mean I wore one last summer at my daughter's wedding. That's probably the first and last time.

Lisa Mighetto: How about you, Phil? You got here the year before Glen arrived.

Philip Davis: Yes, and I never wore a tie either. I think I have come in with a tie and a suit once because I bought this suit for a friend's wedding, and I only wore it once and then I put the thing on and came to work with it. That was about the only time I ever wore a tie. Other than that, it was still quite casual here and we've had some people around here that flat out refused to wear a tie. We had one gentleman, I think he was – I forget what his name was, but I think he was a GS-13 engineer, and he was supposed to wear a tie. He just flat refused to wear it. And when he'd have a meeting, he would have one of those clip-on ties in his desk drawer, so when the contractors would come in and he'd have a conference with them or something, then he would just clip on this tie, and he did the minimum that he could do, and that's how he handled it.

But most of it was quite casual, and we found some people that, as far as their hair and everything, I mean, we had some very neat people coming through here. And some people, there was no dress standard for them at all. They came in

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Yes... all out there in one room. If someone told a joke and someone laughed clear on the other side of the room, everyone would look, you know. But it was a lot more intimate. You could see if somebody was at his desk, and you could go over and talk to him. ...everyone felt this spirit of cooperation.

And then sometime – maybe 1978, '79 they started putting up partitions....

anything they wanted to. But anyway, for the most part it's balanced, quite casual, and Fridays I guess now everybody wears Hawaiian shirts. That's Hawaiian shirt day. You can come to work with a Hawaiian shirt. I never have, but a lot of other people do.

Lisa Mighetto: So, it sounds like from the mid-seventies – by the mid-seventies it was more casual than it had been.

Glen Woodward: The only dress code that I'm aware of is you had to have the Director's approval to wear shorts in the summer. You couldn't come in shorts unless it was agreed to the day before.

Lisa Mighetto: Did that happen often? Did people wear shorts?

Glen Woodward: Well, when it was hot. When we were in the Customs House, it was very poor air conditioning and it was really hot in that building.

Lisa Mighetto: Were there other changes in the workplace that were significant?

Jack Nelson: I have kind of an interesting observation I made. Back when we were in the Federal Reserve Bank building on the third floor, when I started to work it was all one big room. Everybody was visible to everyone. All the structural, mechanical, electrical people were all seen, the whole room.

Lisa Mighetto: There were like 100 employees there.

Jack Nelson: The branch chiefs were all back in their own little fishbowl, you know, and then the chief and the secretaries. They were all in that one little area that was kind of separately closed, but yes, 100-120 people.

Lisa Mighetto: In one big room?

Jack Nelson: Yes. So, they're all out there in one room. If someone told a joke and someone laughed clear on the other side of the room, everyone would look, you know. But it was a lot more intimate. You could see if somebody was at his desk, for one thing, and you could go over and talk to him. You don't have to worry about calling him, "Oh, I'm sorry," and then giving him a phone message. Nobody had phones anyway.

And so if you had something to deal with, you know, they were right there, they were accessible, and everyone felt this spirit of cooperation. We were all like brothers, because we all lived in the same dormitory.

And then sometime – I can't remember exactly when it was – maybe 1978, '79 they started putting up partitions –

Dick Moore: Used partitions.

Jack Nelson: But anyway, everyone started getting segmented off, and this spirit of cooperation just slowly evaporated a little bit. It wasn't intentional, it's just the walls built psychological walls and it's been like that ever since. We've

got these partitions so everybody started dividing their thinking, and didn't cooperate as much. It wasn't a feeling of competition or rivalry or dislike or anything like that. It's just that the openness was gone.

Lisa Mighetto: That's interesting.

Jack Nelson: Yes. You could feel it almost right away.

Dick Moore: When we were in the Federal Reserve Bank building and everything was open, the supervisor could just stand up and look and see all his employees and who was working and who wasn't.

Lisa Mighetto: And who was talking on the phone.

Dick Moore: Who was talking on the phone, and we had one habitual tardy engineer that would come in about 15 minutes - 10 to 15 minutes late every day, and he would walk by, and the supervisor would watch him hang up his coat. He would sit at his desk and start working, and then this would go on for about a week, and then the supervisor would go over and say okay, "I've got my little book here. You've been late for an hour now. Ten minutes yesterday, 15 minutes on day so and so, so you go sign out for an hour's leave."

Everybody knew that they were being watched all the time, and part of the thing was to get away with little tricks or something that the supervisor wouldn't see like reading a magazine in their desk drawer.

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The draftsman would be working but he'd have a magazine or a pocket book in the open drawer and he would be looking at it and watching over his shoulder, and maybe something besides pocket books. There was the story that a guy in the control section, Don McDonald, who eventually became chief of the branch - he was building a transistor radio in his desk on his lunch hour and also during the day when nobody was watching.

So, they opened this area to control the employees more because you were always aware that if you were talking to somebody, your supervisor might be standing behind you listening, and that was one of the ways to control the place.

Lisa Mighetto: And once the partitions went up, it must have been harder to watch everybody.

Dick Moore: That's right.

Lisa Mighetto: Was this the group that was going to talk about the bank robber? Stefanie told me you've got to tell the bank robber story. I haven't gotten all of that.

Philip Davis: We had two young stay-in-schools. They're hired during the summer to help them through school and everything, and anyway, these two young men were - one called himself Mr. B. I've got some stuff in here I'll show you later. But anyway, they got into drugs or some darn thing, buying and selling drugs, and they got into trouble. I think they owed somebody some money and

We had two young stay-in-schools. They're hired during the summer to help them through school, they got into drugs or some darn thing... And so they robbed a bank, and one of them drove the getaway car, and the other one was the guy who actually went inside... after he robbed the bank during lunch, they printed this picture in the paper from the bank camera, and we saw it there and we all recognized him....

By the way, both of these kids paid their debt to society, cleaned up their acts, and later they got married and they had children, and one became an electrician and the other one, he was a salesman for a company, and they both went straight, and the last I heard they were doing well.

someone was going to knock them off or something. And so they robbed a bank, and one of them drove the getaway car, and the other one was the guy who actually went inside.

Anyway, after he robbed the bank during lunch, they printed this picture in the paper from the bank camera, and we saw it there and we all recognized him. We knew where he was, so somebody folded the newspaper so that it would have his picture up there on front, and when he went on his break, they laid it out on his desk and he came back and immediately got sick and he had to go home. But anyway, the other one, eventually he got arrested too and so they both got arrested.

The police, because they were minors, had to treat them differently. Anyway, I remember several times that as this was going on, one had started to mug women on his break, and he came in one day and his fingernail was half torn off his hand, his hand was cut, and evidently this lady fought him and stabbed him with a fingernail file or something, and he came in and said he had a paper cut. The guy said his fingernail was almost torn off and bleeding all over his shirt.

Lisa Mighetto: This is at the Federal Reserve Bank?

Philip Davis: Yes.

Lisa Mighetto: So, on his break he would –

Philip Davis: On his break – evidently they needed money,

they owed money, drug money, something like this, but several times we had the police came in with leveled shotguns and everybody (we'd see a police coming in) just went to the other end of the building. By the way, both of these kids paid their debt to society, cleaned up their acts, and later they got married and they had children, and one became an electrician and the other one, he was a salesman for a company, and they both went straight, and the last I heard they were doing well.

Lisa Mighetto: But they were convicted, so they did do the crime.

Philip Davis: Oh, yes, they did. No doubt about it. They were bank robbers, and they were muggers – but they straightened their lives out. But while that was going on, it was quite the thing, rumors were going around of what are they going to do next time, knock off an armored car or something? But that was just one of the very interesting things that happened in this office. I've got some pictures and stuff in here I'll show you when I get a chance.

Lisa Mighetto: Did that affect the stay-in-school program?

Philip Davis: I don't think it did. When they came in, they hadn't done anything wrong.

Lisa Mighetto: Under the Corps' tutelage.

Philip Davis: Yes, while they were employed. They hadn't broken the law before

they got here, and if they had, they certainly would never have gotten here, because you can't be a felon.

Lisa Mighetto: **Bank robbery is a felony.**

Philip Davis: Yes, and I think he had a record, but the other one was a minor, and one of our supervisors in my section had to go to court, and said, "He's really a good kid" and all of this stuff, and gave some support to him to help them be lenient on him but right after he did that, the kid started mugging women. Anyway, it was quite a thing.

We finally got them out of the door. I saw them both years later. One was about eight years later at the Clackamas Town Center and I sat down and talked with him, and he had straightened out, and he was wearing a nice suit, and both had successful lives, and were married with children, so they had straightened up their act and everything. But it was certainly very interesting, especially when the cops came in with leveled shotguns. Every time I saw that, I just got up and went to the other side of the building. I didn't want to get shot. But it was - I'll show you some of that information later.

One other thing I wanted to point out is that that was so different then, - if I can describe this right - back in the old days, 40-50 years ago when the engineers went to college and everything, and they really stressed over things that they don't stress over now because we have computers for doing things.

But when they did studies - an engineer would do a study, and he might have to have a drawing, a sketch, or something in it, and they really emphasized some really high-quality drafting, very precise. Some of the drafting with the hand part of it was drawn to an accuracy of 1/64 of an inch, which was - that's a sharp pencil! And I've seen some copies of the studies that they had that are now probably in an archive someplace, but when you open them up and you look at all the calculations on a page or whatever, it was all neatly, beautifully laid out, and the formula they used would be written down, and then the process. They would describe the problem they're trying to solve, and then they'd write it all down for the computation standards. They had computation standards, which they don't - I don't know if they have that today, but we use programs today to do that, and we kind of got away from doing everything by hand and the documentation that they did back then.

I was really impressed with some of the quality of the work, the drafting that even an engineer would do for a study, and it's on 8.5 x 11 paper or whatever, versus what they do today. They don't emphasize that today, because everything is done by a computer, and so the lettering is going to be perfect and everything. But I was very impressed with some of the quality of the hand drafting and the sketches that people - the engineers would do. It was just as neat as a pin. And now they don't emphasize that in school because it's all done on computers. And also as these computers came in

and we started doing everything on drafting in CADD, they got rid of all of the drafting tables. Well, the drafting table was where we always laid out our drawings. But we got rid of the drafting tables, but we still had the big drawings.

Also, they kept reducing our size - square footage for employees - down because they figured, you don't need the space anymore, so now we don't have anywhere near the space per individual. Our little cubicles are quite small. But we still have the big drawings, and now sometimes we have engineers who have to lay the drawings out on the floor, and we're also switching over to 11 x 17. A lot of our drawings are drawn with the drafting standards, and HDC drafting standards, and which we try - we're making an effort to follow that as much as we can. Some people just won't. But anyway, the drawings are drawn so that you can print them out at 11 x 17. They're actually 40 x 28. Our drafting standards want everything to be legible when it's printed out on an 11 x 17 piece of paper. That is why the smallest lettering in the main part of the border is no less than 1/8 inch high so it can still be read when reduced to 11 x 17 inch.

And we also all now have magnifying glasses, some because we're just a little older and need some glasses, but also just to be able to see the quality of the printers we have now is extremely good, and they can make very precise prints of very, very small details, and to see it, sometimes we use magnifying glasses.

... when the computers came in, all of our drawings and paperwork that we used got smaller because we just don't have the room on our tables. And we're being quite successful at doing that, designing the drawings, a whole set of drawings that are 11 x 17... and it fits very nicely on a computer table.

But, anyway, that was one thing I wanted to point out, that when the computers came in, all of our drawings and paperwork that we used got smaller because we just don't have the room on our tables. And we're being quite successful at doing that, designing the drawings, a whole set of drawings that are 11 x 17, and we've got a drafting standard now that if you follow it, you can still see everything on the drawing, and it fits very nicely on a computer table, and that was one comment I wanted to make.

Lisa Mighetto: Well, that's interesting and nobody else has said that. So, that is kind of an interesting development.

Well, let's see – Jack has left. Is there anything else that we haven't talked about that we need to address?

Dick Moore: I would be interested in seeing the questions that we were supposed to have seen before we came.

Lisa Mighetto: Well, here's one – what do you miss the most?

Dick Moore: What do I miss the most?

Lisa Mighetto: About working here.

Dick Moore: I don't think I miss anything. I'm enjoying my retirement. Well, some of the people I come down and have lunch with, like today. I keep in contact with a few people, but I don't miss it.

Glen Woodward: I don't either.

Dick Moore: It was good. I mean I enjoyed my career. I felt comfortable and felt the office accomplished quite a bit in all those years.

Lisa Mighetto: Jack, I was asking, what do you miss the most about working here?

Jack Nelson: Oh, some of the people and the technical challenges. I enjoyed working with a lot of people, and then some people I was ashamed to work with. I didn't really like them. But I miss a lot of the people, you know, because they're interesting folks, and they're intelligent. We had some good conversations, and also the technical aspects of the work – the engineering, the challenges and all that were what I got in the field for in the first place. So, I miss that.

Lisa Mighetto: And have you kept in contact with people?

Jack Nelson: Yes, we get together. The power section folks, you know, we come in, and every so often we'll go out to lunch, like we're going to do today.

Lisa Mighetto: Well, Phil, you're still here. What do you like the best about your job?

Philip Davis: I love working with computers and the educated professional people. The computer based drafting is an absolutely incredible technology, this CADD drafting program. Now, I personally like AutoCADD the best. The

government standard is to use Microstation, and right now they're using Microstation Version 8, which I think sucks. It's has problems, and bugs in the program. They made a correction to it and they've still got problems. But I really liked AutoCADD the best. AutoCADD Release 14 or something is the latest one they've got out but anyway, we're stuck with Microstation. We can translate between the two, but to be able to do drawings in AutoCADD, you can draw something to a millionth of an inch, and then copy it over a millionth of an inch, and you can measure it and it will say a millionth of an inch, and in Microstation you can't do that. You don't need to draw anything that accurate. Most drawings don't need to be any more accurate than a sixty-fourth of an inch, but the dimension has got to be whatever it says. You go by the dimension. I would still like to draw things to a millionth of an inch. I also like the way AutoCADD handles text.

And working with the CADD program is really fun. I can say I really enjoy my work; I have no qualms at all about coming to work. I love working with this technology and the CADD drafting programs. We haven't even touched this technology yet. It's just going to get better and better, and it's really made a great impact in the quality of the work that you can do, and the speed.

They did good things back in the old days with the slide rules and stuff. You know, they built the atomic bomb with the slide rule and today the new

engineering tools, the computer tools, the programs, and the software that they can use for engineering is just amazing. And if you learn how to use it right and work it right, you can sure put out a fine product.

Lisa Mighetto: **Okay, is there anything anybody would like to add? Well, thank you all very much.**



Leonard Lee and Bob Hango.



Dick Moore and others.



Phil Davis



Tommy Toyota, Vic Polich, Joann Ken Johannson, Jim Norlin, Mel Taylor, John Jones, Norm Kauppila, Charles Horner, and Larry Jacobs.



Darlene Chairez and Rozana Prater.



Stefanie Akbari-Kenari and Virginia Ray.



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Interviewees: Clay Fouts, Ed Miska, Dick Nelson

By Lisa Mighetto
November 19, 2004
Portland, Oregon

Lisa Mighetto: This is the HDC interview, Portland, Oregon, November 19, 2004, and I suggest we start out by having each one of you briefly identify yourself and introduce yourself. Talk about how you came to work for HDC, and what you've done during your time here.

Clay Fouts: This is Clay Fouts. I started at the Hydroelectric Electrical Design Branch in April of 1963. I went to work in the control section under, at that time, Don McDonald, who was a GS-12, who was in turn working for Al Ding, who was what is now the chief of the subsection. I was hired primarily to work on the Lower Snake [River] control system, what we called the system-optimizing controller. It was a computer based system that had the central computer based at McNary [Dam] with independent supervisory control and data acquisition systems to each of the Lower Snake projects.

I came to work as a GS-7 straight out of college, although I had been an engineer – sorry, not an engineer – I had been an electrician and an operator before coming to work. I was also an operator while I was going to college. That's how I worked my way through school.

Lisa Mighetto: And you retired in –

Clay Fouts: I retired in October of 1986.

Lisa Mighetto: And when did you come back?

Clay Fouts: I've come back three or four times. I can't remember the first time, but I think this is probably my fourth time.

Dick Nelson: It's at least the third. Most recently in April of 2001. Is that right?

Clay Fouts: Yes, 2003.

Lisa Mighetto: So for your most recent return, what was the primary purpose?

Clay Fouts: I came back to work on the GDACS Maintenance Team, the team that was set up to do software maintenance and assist in

hardware problems if necessary, on the ten generic data acquisition and control systems.

Ed Miska: And to develop the life cycle.

Clay Fouts: Oh, yes, and develop the life-cycle management tool to keep things funded and running. I developed the life-cycle cost by year so that we could budget it and not give the projects any surprises.

Lisa Mighetto: Okay.

Dick Nelson: This is Dick Nelson. I started for Hydroelectric Design Center in June of 1972, and I was put on after completing a district training program for Portland District. At the end of that, however, I found a match for my interests in what HDC was doing, and I was hired actually to complete work that Clay had started on the Lower Snake computer control system. So I was primarily involved in real-time programming and real-time control, and that was the early seventies.

My career, in a nutshell with HDC, is that I worked in the control groups until about 1978, and moved into a major electrical equipment group for a period of time after that, and then into a management first-line supervisory position in 1981 with the control group, and powerhouse control and communication group, and in 1986 into a middle-management position with the Electrical branch. I was chief of the Electrical branch.

Then in 1997, with our reorganization, my position changed from Chief, Electrical to Chief of the Pacific Design Branch.

Lisa Mighetto: Okay.

Ed Miska: I first hired on here right out of college in October 1977 and, of course, I did a one-year training period that all new hires out of college were required to do. So I was out around the Corps for a year, and then when I came back I started in the controls subsection of HDC.

Lisa Mighetto: Did you pick that, or did they assign you?

Ed Miska: What do you mean?

Lisa Mighetto: When you said you were out and around in the training program.

Ed Miska: Well, they just send you various places so you get a feel for what the Corps of Engineers is, and that includes rotations within HEDB, but at other Corps offices in the Portland District as well as out at Chief Joe, which is where I spend most of my field time.

Anyway, I was always interested in computer-oriented stuff as the primary thing, which means controls. And so I came in here and started working on the patrol stuff. Probably the most significant thing in terms of way back then is when Dick Nelson left the control subsection and went to work for MEE section. He was working on the Chief

Joseph computer control system at the time and that job was then handed over to me. So I was finishing up the software work on the Chief Joseph Dam, work that Dick had started.

Lisa Mighetto: Okay.

Clay Fouts: I'd like to say some more if I could. I said I came to work in April 1963. I came to work as a GS-7 and went up the ladder of GS-7, 9, 11, etc. But about 1965 they split the control section and created the remote control and communication subsection. And that was primarily to give Don McDonald a supervisory position as a GS-13. Mac was a good engineer, and deserved it from the early work that he had done on the Lower Snake control system. He was the primary author of Design Memorandum 29 that set up the idea of the control system for the Lower Snake.

Then about 1971 I was promoted to head of that remote control and communication subsection, and I was a supervisor in it until 1976. During that time the leadership of HEDB changed. Larry Fisher had been the head of the electrical section, but he had advanced to the chief of the branch, HEDB. Well, when Larry retired and Bob Krahn took over. He had been head of the Major Electrical Equipment subsection. And then Bob took over the chief's job, and Don McDonald advanced to head of the Electrical Section.

Then after Bob left and went to WAPA, Mac became chief of the branch, and Glenn Meloy

moved up to chief of the Electrical Section.

Shortly after that, in 1976, I transferred to Operations and took a job working on the control systems in the operation end of it.

Dick Nelson: You might want to mention here the significance of some of that early work, the control computer areas. Today it's taken for granted that if you've got a control system there are computers in it and any powerhouse anywhere has that. But this was the first that it had been done anywhere.

Lisa Mighetto: Anywhere?

Dick Nelson: Anywhere, yes. And so the installations that Clay and Don McDonald were responsible for at McNary and on the Lower Snake were the first, using some very early versions of process control computers that IBM built. It was very precedent setting work.

Clay Fouts: I was probably involved in that. That's primarily the reason that I was hired to do that work, and I was honored to be chosen to do it. It was primarily Larry Fisher's idea. He interviewed me when I was looking for a job when I got out of college and because it was exciting and new I passed up more lucrative offers from GE, the Jet Propulsion Lab and also Pacific Gas and Electric to come here.

Lisa Mighetto: So it had never been done?

Clay Fouts: No, we were the first. It was fun.

Lisa Mighetto: What were some of the challenges you encountered?

Clay Fouts: The technical challenges were there certainly, but the primary challenges were social – getting the operators to change to accept the idea of control systems and remote control. That was the toughest.

Lisa Mighetto: What was their objection?

Clay Fouts: Primarily, they just didn't like the change. The major objection was that they didn't, let me put that a different way. I think it was self-interest on their part in a lot of cases because they could see themselves being displaced by a computer, and they didn't like that, both from the standpoint of losing a job, and from the standpoint of thinking that a machine could do the work that they had been doing.

Lisa Mighetto: Why was this first? That is, why were the Lower Snake projects chosen? Is it because they were in the design and construction stage right then?

Clay Fouts: No, the only project in existence at that time was Ice Harbor. We were just starting to build Lower Monumental and marching up the river with the Lower Monumental, Little Goose, Lower Granite, and Dworshak projects. And I have to admit that the primary impetus from that came from the Chief of Operations in

...the installations that Clay and Don McDonald were responsible for at McNary and on the Lower Snake were the first, using some very early versions of process control computers that IBM built. It was very precedent setting work.

Today it's taken for granted that if you've got a control system there are computers in it and any powerhouse anywhere has that. But this was the first that it had been done anywhere.

Walla Walla, at the time, Dick Earnhardt.

Lisa Mighetto: Dick Earnhardt?

Clay Fouts: Dick Earnhardt, and he suggested – and this was before I got here, so it's second-hand for me – but he suggested that it would be a good idea to remote control the Lower Snake plants, and the idea was to reduce the number of operators on shift at the Lower Snake plants.

Theoretically, it's possible to run the plants without any operators at all, but we elected not to do that because of the navigation locks. We did not feel – the Corps did not feel – that it was safe as long as there was human life involved to automate that operation, so we didn't.

Therefore, as long as we had to have at least one operator on shift, it was the smartest thing to have him qualified to operate the power plant as well as the Navlock. So we always had one operator on shift, even though the project was remotely controlled. And there were a lot of growing pains with that. Dick ran into it when he was working on that system.

Dick Nelson: Yes, there were. And Clay does minimize some of the technical issues. Those were, of course, the easier one to fix, and there were numbers of challenges in that area. Their equipment was really in its infancy for the type of stuff that we were doing. The plants – one of them was originally designed for the purpose, so there was a fair amount of modification at Ice

Harbor. Lower Monumental and Little Goose on up were designed specifically for it, so there were technical challenges. But the people side really was the biggest one, and it was a culture change. It was a culture change that hadn't occurred in the industry yet, and we were right at the lead part of it.

Lisa Mighetto: And you were aware at the time that you were in the lead?

Dick Nelson: Yes. Oh, yes, and, of course, I got in on the end part of that and the completion of the work, but yes, clearly so. Clay, you guys must have presented papers all over the place on this stuff.

Lisa Mighetto: Oh, did you?

Clay Fouts: Yes, we did. The first one was in Chicago at the Illinois Institute of Technology, a sponsored meeting, what the heck was the name of that thing – American Power Conference.

Lisa Mighetto: And how was that received?

Clay Fouts: Mac and I went back there and presented a paper on it, and oddly enough, because we were government employees and pushing the idea of government power, most of the people there were private power people, and they didn't accept that at all. We got a lot of remarks from the audience after the presentation about it.

At the time the Corps was talking about putting in a tidal powered hydro plant in New

England, and we got knocked around about that. We had nothing to do with it, but they took it out on us, and that was kind of fun.

Lisa Mighetto: So they didn't seem interested in how this could be applied to their plant?

Clay Fouts: They were, I think, but they were more concerned about the idea of public versus private power. They didn't like the idea of publicly owned power plants.

Lisa Mighetto: And then you gave other papers after this Chicago meeting?

Clay Fouts: Yes, various places. The last one I gave was to the operations people in Sault Ste. Marie. That was in 1969-70. No – you're right, my memory is going.

Lisa Mighetto: And Sault Ste. Marie is a Corps project?

Clay Fouts: Yes, there is one there, yes. Let me think – '78. That was in 1978.

Lisa Mighetto: Eventually did other projects look to you for expertise on how they could do this, too?

Clay Fouts: Oh, yes. I went back to Omaha in '65 or '66 and talked to the Omaha District people about these power plants and the way we automated them, and later they did almost the same thing on their plants. And Dick and I went back there a few years ago and went through their plants.

Dick Nelson: It was more than a few, Clay. I think Ed was there, too.

Clay Fouts: We went back and talked to them, and I think we ended up redoing a specification for them, too, didn't we?

Lisa Mighetto: And did the operators ever come around? You said it was a culture change.

Dick Nelson: We saw it and what I noticed was something very similar that I noticed back in the early eighties as we were bringing automation, pure automation in the work force. There were some folks that just refused to change. They never did learn how to use the computer in the office, and the same thing in the field. There were some operators that were just determined that there was no value there. And until they retired, that didn't change, as the new group came in.

On the opposite end of that, there was a group of operators that were quite a bit more progressive, and they generalized. They tended to be the younger folks, and they saw it as the wave of the future. And so they were very personally interested in becoming part of it, not only learning how to operate it, but how it worked, and to make a lot of input into how it should work and so on.

So there was a wide range, but it was years before it was widely accepted, and I think primarily because folks left. The numbers dropped off and so on.

Lisa Mighetto: And as younger people came in, this was standard?

Ed Miska: It was the norm, and it's something the younger people wanted to have, obviously, for their own careers. They wanted to have experience working with automated control systems, because the whole world was going that way.

Lisa Mighetto: Were there security issues?

Ed Miska: Back then there were so few people who knew computer stuff that really, in terms of communications or security issues like you think of today, they really didn't exist. In fact, at one time I had a modem so I could call up and work on Chief Joe software from the office, and I basically could walk around in that whole system anywhere I wanted to. We would never allow that today because of security based on the fact that there are very few people that would know enough to cause a problem has long vanished.

Dick Nelson: That was one of the nice things about - as a young person coming out of school in the environment. Our office management philosophy wasn't nearly as progressive as it is today, and as collaborative, and a lot of the folks that came in had pretty tight controls over what they did. But the truth was in the control area there were very few people that really understood it. And so if you got work in that area, you were pretty independent and there wasn't anybody looking over

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...one of the programs that I wrote was a data entry program to go with the console program for the operators interface at John Day and the machine kept dying and nobody knew why. And I kept going out and looking at it, and it started up, ran fine. And finally, one of the operators that I knew took me aside and said, "Try entering a unit number of zero."

So I did, and that killed the machine. That's how they did it. They did it on purpose. Use the number zero and it would die. So yes, that was sabotage then, too.

your shoulder because they didn't really know what you were doing, other than the final output end product.

Lisa Mighetto: But you had more freedom then, I heard.

Dick Nelson: Quite a bit more freedom and independence to work then. And somebody else who was doing some of the more conventional design stuff, and the technical review was Nick Bruble in our office in the early days. I mean, it was very, very tight, so very little independent work was done.

So anyway, that was the nice thing about controls. Of course, as time went on, that started changing, as old people got up to date about computer systems.

Clay Fouts: That's true about the early reviews. I remember one time – are anecdotes all right?

Lisa Mighetto: Oh, sure.

Clay Fouts: I remember one time when John Carter took some drawings in for Larry Fisher to review. John worked really hard on those drawings, and then he took them in to show them to Larry for review and approval. And Larry, as I said, was an excellent engineer. He could look at a drawing, and if there was anything wrong on it, he could spot it. I don't know, it seemed to be an instinct with him. But John laid the drawings out in front of him, and Larry started looking through them and he put his finger on this one spot on the drawing and said, "Look at that.

The whole damn thing is wrong. Get this out of here and fix it." John Carter came out of the office mumbling and shaking his head. He was really upset.

Yes, the review process was brutal in those days. Yes, it was.

Lisa Mighetto: But you didn't have to go through it?

Clay Fouts: No, they didn't know what we were doing. It was great.

Dick Nelson: Clay, you must have some stories about dumping power plants.

Clay Fouts: I do.

Lisa Mighetto: About dumping power plants?

Dick Nelson: Control systems.

Clay Fouts: I mentioned that we put the first computer in on the Snake. We were successful at that, so we started putting them in down the river. The next plant to go in was John Day, and for better or for worse, I did most of the software on that project. And one of the programs that I wrote was a data entry program to go with the console program for the operators interface at John Day and the machine kept dying and nobody knew why. And I kept going out and looking at it, and it started up, ran fine. And finally, one of the operators that I knew that sort of apparently took a liking to me took me aside and said, "Try entering a unit number of zero."

Who would enter a unit number of zero? I mean – going from 1 to 16. So I did, and that killed the machine. That's how they did it. They did it on purpose. Use the number zero and it would die. And they found that out and they kept doing it. So yes, that was sabotage then, too.

But on that same machine, Dick was talking about dumping plants – there was a flaw in the operating system. It was a new system from General Electric at the time, and a fellow named Gene Neary was on as an operator on the graveyard shift. I came in early the next morning from a hard night at the motel, and Gene told me that the machine had dumped all eight of his units during the night, and never said why, it just killed them, knocked them all offline, opened all the breakers.

Well, it turned out that we had a trip contact wired into the computer, and we intended to trip the unit on over-temperature in case any of the units got too hot, or a bearing got too hot, we'd trip the unit. Well, the flaw in the operating system was that whenever this fault occurred – and it was random – whenever this fault occurred, that it went through and operated all of the digital outputs at least once, something like that, then it dumped all the machines. Then I walked in the next morning and Gene was still fuming. And he made some remark about the computer, and I said, "What's the matter, don't you like being replaced by a machine?" He almost came across the desk. He was mad.

Dick Nelson: This is how you would become infamous in those early days, was by dumping a whole plant. And the plant the size of The Dalles is big and significant in the power contribution. And most all of us that worked on these early systems did that once – at least once.

Lisa Mighetto: It must have been stressful.

Dick Nelson: Well, yes, it was kind of stressful.

My story in that area comes at Libby and it was about 1976-77, and I was transitioning into doing the finishing of that job. Another engineer had left. He actually took a different job, and we were up there at the same time. So it was a transition time, and I was writing some voltage control programming for it.

It just so happened – this other guy was Don Evans, and his in-laws and his wife were in the area, and dropped by on the weekend, and so he gave them the grand tour of the plant. And it was a Saturday and we were in working, trying to make the program work, and he was trying to entertain his in-laws. So they were downstairs, and I started up a new control program, and it had a bug in it, and it drove the voltage on the units up to the maximum part. And there are protective circuits on our machines that keep it from going too high, so the computer can say what it wants, but it will only go so far.

But this was a new plant, and the circuits weren't working right. And so what actually happened was it went into a big oscillation where the reactive generation changed very rapidly. In fact, the machine was going from -30 VARS to a +120 in about a 10-second cycle, up and down.

Lisa Mighetto: And you were watching this?

Dick Nelson: Yes. It was enough voltage change on even the station service . . . even the fluorescent lights were increasing and decreasing in intensity. But the interesting part happened because alarms go off when that happens, though, and the problem was that Don's in-laws were right down at this same generator and happened to be walking right by that. Alarms were going off, and Don told me later, he said he looked at them and said, "Don't worry about this at all because it's normal for alarms to go off in the powerhouse."

Well, about that time the operator and I were just going full board down the stairway and running the corner. Don said the timing was perfect. "Don't worry about this at all," and we come running around the corner trying to get control of the generator back manually.

Clay Fouts: That was funny.

Dick Nelson: Yes, it was. It's funnier now.

Lisa Mighetto: Did you . . . ?

Dick Nelson: Yes. Actually, that was an even more interesting story because it was a weekend and it was a problem on the generator itself and the exciter. And the erection engineer from the company was still in town, and we knew where he was staying for the weekend, and we needed the drawings and they weren't out there. So we went to get them, but that was Bruce.

Clay Fouts: Chadwick.

Dick Nelson: Bruce Chadwick. Starting Friday night before work was over, he started kicking back, and he was so under the weather that he was just barely able to function. But he couldn't help us solve the problem. He pointed us to the drawings, and then a couple of hours later we chased it down and fixed it.

Lisa Mighetto: Well, you say it's funny now, but at the time you must have been stressed.

Dick Nelson: That was much more stressful, and of course, I say that from a more senior position. Gosh, a junior engineer working on a machine and you had the whole thing go like that, you know, it wasn't comfortable at the time, no. It never was.

Clay Fouts: That reminds me, too, of all the guys that were in that subsection at that time, they all went on to have extremely successful careers. It was Steve Brockshink who became chief, of the electrical section, and then went on to a successful career in Operations.

And you became chief of the Branch.

Lisa Mighetto: And you're talking about Dick?

Clay Fouts: Yes, Dick became Branch Chief, and then Don Evans who was in our section is now Vice President of an engineering organization outside the Corps. I hated to see him leave, but he did, and he's been a very successful engineer.

Lisa Mighetto: And do you credit these early experiences to your success?

Dick Nelson: I think it's just a better class of people that were working on the machines, a more intelligent bunch, I think.

Dick Nelson: I don't know, maybe it's the independence they let us work to. That's possible. They were the best jobs. They really were the best jobs here at HDC. And, of course, when you can work on precedent-setting stuff that hasn't been done before, or even if it's in its early infancy, that's the stuff that from an engineering standpoint you want to do.

Dick Nelson: There's been just a tremendous change in the architecture of the computer system since then, and the growth of them.

Lisa Mighetto: Do you want to talk about those changes?

Dick Nelson: Well, yes, some of those are interesting because Clay represents actually a very conservative element there. And

this is Dick Nelson again. Clay Fouts, I think, was a firm believer that if you could not physically see a program punched on cards, that it didn't exist, or on paper tape either. And those were all various input mediums that we used to program the machine - cards, paper tape, and so on.

And so the industry was growing much faster than that, and they were moving to electronic media where you would store stuff electronically. Clay was always hesitant to go there because, again, if you couldn't see it, it wasn't real. And that brought on years of a joke that were going on in-house. Clay would get these little paper tapes from a paper tape haranguer, reminding him - and it didn't make any difference, it followed you all over the country when you left - from one of our engineers who remembered that Clay was the one that kept us back in the dark ages of paper tape so long.

We actually - the systems grew to the place where we could - the error rate on the readers was high - it wasn't high, but it was high enough that you couldn't read in everything accurately anymore, and at that time you had to switch.

Lisa Mighetto: How did you keep up with changes in technology? Were there professional associations? I mean, it seems like it changed - it's changing now so fast.

Clay Fouts: Well, there were professional organizations, yes. I'd like to say that Don Evans and

Steve Bradshank and I founded the computer society here in Portland.

Dick Nelson: IEEE?

Clay Fouts: Yes.

Clay Fouts: Yes, there was that. There was also a lot of information you could pick up from vendors. And so a lot of the training, especially in the new stuff, came from vendor visits and some training that they would offer periodically.

Lisa Mighetto: Was that because they were trying to sell you a system?

Clay Fouts: Because they were trying to sell the new and best thing out of the block.

Dick Nelson: Yes, so that was another mechanism. I guess the third was we were in the process of doing – we started with the Lower Snake, but over the next 15-20 years, we automated all of our powerhouses. And so over that period of time, we were writing contracts and then working very closely with manufacturers that were building new systems. So there was a fair amount of education in just the process of doing – as we added them.

That was one of the real problems was the way the Corps approached it. The original systems that were installed were pretty much one of a kind. There were a lot of components in them in software that was proprietary, and the marketplace changed very rapidly, the technology. All that combined to make the

systems very hard to maintain. It was very difficult down the road to keep people around that still remembered, and had the detailed understanding of how the system worked. And it wasn't – and folks would move on, get promoted, move on and move out, and you would lose the capability. And then sometimes very simple things would result in the machine becoming obsolete, or the system, and you had lost that knowledge and skill and being able to do.

So our systems had a very short life. Eight, ten years, somewhere right in there, and then they were replaced in their entirety, and that's what Clay is heading up now is a group. We actually, starting in 1997, Ed and Clay were very actively involved in a new process for this, where we built our own system, and we installed it everywhere the same. And there's enough installed system now to support a maintenance base, and a life-cycle maintenance strategy for it.

Lisa Mighetto: And that's what you were talking about earlier.

Dick Nelson: Right, and that's what we wooed him back out of retirement the last time for, was to be the team lead on that team; that is a permanent team now, fully responsible for this. Plus the systems were designed so that they could be replaced piecemeal, or parts at a time instead of replacing them all at one time.

So it's a continual annual maintenance process that keeps the system up to date, and we think will give it a very plusher

I was out at the Chief Joseph powerhouse and I and the electronics tech guy walked down to the generator floor and all of a sudden we heard this little pop, and smoke was rolling out of the cabinet housing the unit control computer equipment. So the electronic tech ran to where the unit control power circuit breaker switches were and turned them ALL off. That took the generating unit off line....

When I went back up to the control room, the operators there insisted that I had done something to cause this to happen. So, I got blamed for dumping the unit....

life, where before we had – which is significant. In fact, that whole thing reflects a dream that Clay had originally when he started. It was passed on to both Ed and I. In the environment of the Corps, the way we were funded, and the way projects were done, we always dreamed of the day that we could get a group together that was responsible for the long-term maintenance and continual support. And so what we saw here with the start-up of this team just a couple of years ago was something that Clay had worked on for years and years, and that we all wanted to see happen. It was very positive.

Ed Miska: One of the most significant things that made it happen, though, I think, was the field folks. They experienced that one-off versions of everything that were hard to maintain both for software and hardware. And so we got very good field support to help us move to a common design that could be much more easily supported.

Let me mention one odd powerhouse experience. I don't have any lose-a-power-plant stories like you guys, but I've got one that's kind of interesting. I was out at the Chief Joseph powerhouse performing some software work, and I and the electronics tech guy walked down to the generator floor near one of the generators computer controllers, and all of a sudden we heard this little pop, and about 10 feet away smoke was rolling out of the cabinet housing the unit control computer equipment. And so the electronic tech quickly ran to where all the

unit control power circuit breaker switches were and turned them ALL off. That resulted in taking the generating unit off line, which probably wouldn't have occurred if he hadn't turned off the control power.

When I went back up to the control room, the operators there insisted that I had done something to cause this to happen. So, I got blamed for dumping the unit. Just that fact that I was in the proximity when the equipment failed was enough for them to conclude I must have had something to do with it.

Dick Nelson: And that was a very common theme in those earlier days. If anything went wrong, it was the computer's fault. Yes, very common.

Ed Miska: Anyway, it's funny looking back on it. I didn't like it at the time.

Lisa Mighetto: What did cause it?

Ed Miska: I never actually found out but it was probably just an electrical component failure that shorted out. It burned a bunch of electrical components so bad that we couldn't exactly tell where the originating failure was. There is no way it could have been caused by programming I was working on.

Lisa Mighetto: Well, are there other developments that we should be sure to include in the history?

Dick Nelson: Yes, you've got us all talking here about our

control background, which is what all three of us probably enjoyed the most here. And, of course, there are many, many other things that have happened at HDC over those years that are significant.

Lisa Mighetto: Well, how about even within control? Well, you mentioned – you talked about security earlier and how it wasn't an issue. Well, it must be an issue now, especially after 9/11. Has that changed things?

Ed Miska: I'm not sure what to say that would be very interesting. Yes, it's a big issue. Yes, we have to do lots of things that clamp down on our ability to remotely dial in, but it's kind of mundane.

Lisa Mighetto: Okay. Well, it probably was an issue even before 9/11, right?

Ed Miska: Oh, yes, it's always been an issue. I mean, it's never something you just took for granted. It was a risk analysis kind of thing. And so even way back when we were just using modems at slow speed – they called them "high speed" then, in the late 70's – slow speed modems to dial in from here to the project. We knew that there was a possibility that somebody could potentially try to dial in like we were dialing in. But the equipment was very expensive and very few people who knew anything about how it worked. So the risk was very low.

Lisa Mighetto: So you didn't have problems.

Ed Miska: Never, and we didn't worry much that we would.

Clay Fouts: Well, that's a thing you mentioned earlier about the proliferation of computers. That was kind of a two-edge sword because everybody started using them, and the guys that became good programmers and good hackers figured out ways to get into them illegally and screwed things up just for the heck of it.

Lisa Mighetto: So that happened, just like vandalism?

Clay Fouts: Yes. It doesn't happen to us because our systems are isolated, but of course, if you have a home computer, you better have a firewall in it.

Lisa Mighetto: Oh, right. I thought you were talking about the project.

Ed Miska: For one of these I'm not aware of any security problems that have occurred.

Clay Fouts: I'm not either.

Dick Nelson: I don't think anybody has ever gotten in. It's a very tight controlled access, although we are spending a lot more effort to make certain that is true now. And we're also using a class of software now in our operating systems that's much - and we intentionally selected it from the current industry and the Internet because we thought the chances of it being maintained and staying current and supportable was greater. So we're using the same types of

operating systems that a lot of the personal computers are, and have got this big focus of viruses and stuff coming in.

So along with that comes all of the work associated with the bug fixes and the patches, and the security improvements, and keeping up to date on that. And that is a very big job for us right now. Very big. A lot of people are tied up in that.

Lisa Mighetto: As more and more employees got computers, I mean, I've talked to many people on interviews that said first there was one computer for 30 people, and then everybody had a computer.

Dick Nelson: One computer was for the boss. It wasn't for 30 people.

Lisa Mighetto: And then everyone had one -

Dick Nelson: Eventually.

Lisa Mighetto: - on their desk. Did that sort of ease the perception that you were talking about earlier, that oh, the computer must be at fault, or my job is being replaced by a computer. As they became more prevalent -

Ed Miska: I think there is less of that than there used to be, less blaming it on the computer system. But there is still some of that. It is not gone.

Lisa Mighetto: Okay. Well, are there other developments that we should be sure to include in this history?

Dick Nelson: I don't know who you've interviewed yet, and would be surprised if you had not picked up on some of the significant changes that occurred to Hydro Electric Design Branch as we transitioned into the Center of Expertise, and then the Mandatory Center of Expertise. There were major cultural changes that occurred, and it really began in the middle eighties and late eighties, and by the time we were in the nineties, it was full force. We changed our work force and our culture from - to a much stronger customer focus where our customers - we defined our customers as all these people at the projects in these powerhouses that the Corps had as being our customers, the folks that operated the machines, as we focused our attention on what they wanted, and in giving them a bigger role in determining the outcome of all of that. In short, we decided that we needed to make a significant cultural change or we would lose it to the place where we integrated the customer and deal folks into the decision-making process and in the work process much more than ever before.

In the early days, HDC was, in the terms, the nicer terms, proud and arrogant and pretty autocratic. We saw ourselves as - the organization saw themselves as the group of experts, and there weren't any others.

Lisa Mighetto: So no other agencies had -

Dick Nelson: Well, there were other agencies, none with the size and the amount. The

...so being able to modify the control system as we go was much easier to provide the projects with what they needed for maintenance and operations.

The other big positive is the process of doing this in a team-built relationship with all the customers in the field... And so there's tremendous value in that, just knowing one another, understanding where we were coming from.

We ended up with a much better product overall.

Bureau probably comes closest to the federal area there. But it was a philosophy, and there was a managerial philosophy associated with that, and that changed.

Really the largest changes came when Curt Faulconer became the director, and this was about '95, somewhere in there – 1995. And over a period of years, from then until now, we changed the way we do business significantly, and we reorganized to emphasize the importance of the customer. We reorganized our regional teams that placed stealth at the waterfront.

Lisa Mighetto: As opposed to discipline?

Dick Nelson: As opposed to a discipline or a functional organization. We participated – actively participated in organized teams of folks that do design work that we've got mission responsibility for, but we utilize teams.

The generic DACS – the GDACS data – Generic DACS system stands for Generic Data Acquisition and Control System, and that project kicked off in 1996, December 13th or 15th, one of those days when the decision was made that we were going to do this ourselves. And not only was the decision to build it in-house, but it was to work together in a team. We had a short fuse on this for a number of years – to bring in the field folks in as part of the effort, and it was the very first regional project that we did where everybody in the field, from the operator who operated it, to the technicians

that maintained it, to some of the technical people on the staff who were involved in the installation – design installation process, and what we learned from all of that was that – a couple of things. It takes longer. It was a lot faster and more efficient for us to do it because we had the background and the experience, and we didn't have a team that needed to be brought along to buy into it.

Lisa Mighetto: So there wasn't all this coordinating and consulting.

Dick Nelson: There wasn't as much coordinating and consulting and education, quite frankly, as some of the other players involved in it. So, it took longer, but the payoff for it came. Folks that used the machine in the field had ownership, and it was theirs. And that was an issue that we had on a lot of our earlier systems, that they design, they be installed, they'd have a glitch here and there, and the operating staff or the maintenance staff would just write them off. And that old computer again, it may never work, and that was it. Now they're part of it. The computer is theirs.

Lisa Mighetto: So they work with you to get through that?

Dick Nelson: Well, they work very actively as part of it, so that a lot of the success of this big – what do we have, ten projects now with two more coming in. This is a \$35+ million dollar project over that period of time. So a lot of the success came from the approach – the team approach that it was taking, and the buy-in.

Operators developed their own display screens. They felt a part of all of the testing – the factory acceptance testing. I didn't mean to indicate they individually configured their machines, but they made strong input into how the system would work regionally. And so – and that cost a little bit more also because there was quite a bit more travel and quite a few more meetings associated with it. But the big lesson was – is that when the system was done, it was much more acceptable.

So, count it as a success not only from the design standpoint and from a management standpoint of reviewing it, from our power marketing agency who paid the bill for it, but from the operators themselves as being that. And that's something that we didn't always enjoy with the old systems. So, I would say that's a big change.

Ed Miska: Let me add to that a little bit. One of the big pluses we had with building our own is we could change course, or modify something at our own discretion without a large involved effort. Previously, we would have had a contract and working through the contract modification was time consuming and expensive. It was frequently very difficult to get a price out of the contractor that was acceptable. And so the contract process itself was not conducive to providing the end product we actually wanted.

During the course of a contract there were always elements, revelations, or

interpretations that were not foreseen. We always had items to modify. Sometimes we just held the changes until the contract was complete. That resulted in a follow-on time frame where we modified software after the contractor was out of the picture. We would then fix what was reasonable including what the contractor didn't do correctly. But that's not a very efficient way of doing business either, so being able to modify the control system as we go, it was much easier to provide the projects with what they needed for maintenance and operations. We ended up with a much better product overall.

Dick Nelson: The other big positive from this is – Dick Nelson again – is that the process of doing this in a team-built relationship with all the customers in the field that we didn't have before. And so there's tremendous value in that, just knowing one another, understanding where we were coming from.

The truth is, when the final product is done, when you design by committee, you don't always do it as well. You compromise in some of the areas technically. But the benefits from all of that just outweighed all of the technical disadvantages.

So anyway, that really worked so well that we were asked to assemble this long-term if it's seen by the customers. It was their idea to put the whole thing together. So this thing that Clay and Ed and I had dreamed about being done, and we could never convince people to do,

we were actually asked to do as a result of that process that we went through. So that was the interesting lesson in all of it.

Ed Miska: I've got to add this because I think the two of you were probably against this one. Now that we more or less finished the GDACS we're starting to apply the same process to governors, and working on developing or building our own. And so we're in an early phase, where we're working with the field and working with our own engineering staffs to create a governor that is based on the GDACS technology concept of maintainability to the future.

Lisa Mighetto: And how is that working?

Ed Miska: Well, we've got one up and running right now, but it's not the first production version that we want to reproduce.

Clay Fouts: We install now – prototypes coming soon.

Ed Miska: So, we have a basic governor functionality already in. We want to add lots of extra features that make it the easy user interface, applicable to multiple locations. And once we do that and we evaluate it, we'll decide whether or not to propagate it elsewhere. So, in a way, the whole GDACS job had to come before we ever got to this job, or it would have never done it.

Clay Fouts: Well, that's about all I have to say about it. I would like to make sure that the

early guys weren't forgotten in this history. I'd like to make sure that Larry Fisher, Don McDonald, and Bob Schuknecht, and my old boss, Al Ding, are remembered in this history because they are the early leaders. Without their leadership and support, we could never have done this.

Lisa Mighetto: Are there other significant individuals?

Clay Fouts: Not in HEDB at the time, but Bob Bruck was back at the chief's office. He was pretty supportive.

Dick Nelson: We could list a few that were not supportive, like our bank robbers.

Lisa Mighetto: I've been hearing about these bank robbers. So what happened?

Dick Nelson: It was when we were over in the Federal Reserve Bank building. We rented space on the third floor. Security was pretty high in that building, as you might imagine. And we had an employee, a younger kid who spent his lunchtime robbing banks.

Lisa Mighetto: Did you know him?

Dick Nelson: Well, yes, he worked in our Major Electrical Equipment group, and he was part-time, and he had been hired there for HDC. I think he was a student, if my memory is right here, and so on. Anyway, one day at lunch one of the cameras caught him, and the picture was in the paper. And someone turned him in, and one lunchtime

the Portland Police showed up, along with the security people -

Lisa Mighetto: On your floor?

Dick Nelson: My first reaction to it was it was kind of funny, but the security guards in the bank were not laughing at all. They were dead serious about this, handcuffed the poor guy and ran him out.

Lisa Mighetto: And what happened to him?

Dick Nelson: You know, I don't remember what his conviction was. He never came back to us.

Clay Fouts: He worked for Doug Sealy.

Dick Nelson: Yes, he worked for Doug Sealy.

Lisa Mighetto: Well, I've been told you had some colorful characters.

Dick Nelson: More than a few. Those were the most colorful.

Lisa Mighetto: Well, is there anything else you would like to add that we should be sure to include in this history?

Clay Fouts: Just that we're all good-looking, intelligent men.

Dick Nelson: I think as I look back over my 30+ years here, that the thing that I think is most significant, the one single thing I would figure out is that our organization, Hydro Electric Design Branch to start with, now Hydroelectric Design Center, one

time part of a Center of Expertise, now a Mandatory Center of Expertise for the Corps, that our success really came because we were willing to change with the times. And although we went a long time, clear up into the middle eighties, toward the end of the eighties before that change started, there was recognition in the organization, and that was not just by the leadership, but eventually by everybody who was there, that we needed to change, to adapt to the new culture and the way things were being done, and that our success as an organization, you know, and surviving as an organization to provide the products that we do really came as a result of our willingness and ability to flex. And had we stayed the same, there isn't any regulation in the world that could have kept our customers working for us. The change was necessary.

And so that is the big thing that I see, is the willingness to do that. Very interesting from my perspective as I was inside on this, to see how that changed occurred, how some folks were able to transition and others were not. Some change occurred only after retirements occurred and certain folks left the organization.

Clay Fouts: That doesn't apply to me.

Dick Nelson: That wasn't Clay. So, when you look back over that and see the process of how it happened - it would be to adapt.

Lisa Mighetto: That was Dick. So that became part of your

culture. Do you think people are hired who are flexible?

Dick Nelson: Nowadays, yes. And, of course, it certainly is a key part of what we look for in employees now. It's what we recruit for, those folks that fit well in team processes, work well with others, are extremely good technically, but also have the ability to work with others and bring them along with them.

So yes, I think so. And, of course, we've had several generations of it covered here, and each generation has been a little different in what they want. Clearly, our current generation would not have survived in the early HDC - or HEDB.

Lisa Mighetto: Why not?

Dick Nelson: Well, back in those days, I mean, there wasn't a whistle that blew at 8:00, but everybody picked his or her pencil up at 8:00.

Lisa Mighetto: No flextime.

Dick Nelson: No flextime. Good heavens, no. Some people did develop the skill of being able to sleep with a pencil in their hand, though. Was it Clarence that fell off his stool doing that one time? But there was no flexibility.

Our office, this is the thing that I faced when I started, was like one large bullpen. I mean, there were no partitions. All the desks were just kind of shoved up against each other. There was one telephone for 45 of us.

Clay Fouts: Extension 345.

Dick Nelson: Yes. And we had a technician that answered that phone, and if you got a phone call and you sat back in the middle of the building, he'd answer it and then he'd yell out, "Nelson, it's for you." And you'd get up and you'd walk over to this little place and talk on the phone.

Ed Miska: I heard a story about a 45-minute lunch. I don't know it, but maybe you know it, how it came about?

Lisa Mighetto: The 45-minute lunch?

Ed Miska: That was back then, when we had specific time frames.

Dick Nelson: Yes, very fixed time. Everybody did everything within a schedule.

Ed Miska: Yes. I could tell it, but it's just kind of hearsay from my viewpoint. What I was told is everybody had to have the same schedule, and we ended up with a 45-minute lunch because some general or colonel or somebody decided that's what it was, and that's what he wanted, so the rest of us ended up doing it, too. It was kind of odd to have 45 minutes versus an hour or a half hour.

Dick Nelson: As well, in those earlier days, the younger engineers particularly were not empowered to do very much, and everything that they did was heavily reviewed very carefully. There has been a big transition there. As we've done much more

with fewer people, we've needed to, and that was one driver for it.

The other drive is that our current work force - the current graduates wouldn't tolerate that.

Lisa Mighetto: So the whole culture has changed.

Dick Nelson: The culture has changed, yes.

Lisa Mighetto: Thank you.

Dick Nelson: Anyway, those are the big changes overall.

Lisa Mighetto: Well, does anybody have anything to add? If not, then, thank you all for your time and input.



Dick North, Jerry Koenig, Bob Boyd, and Dick Nelson, seated.



Ed Miska.



HDC Director Curt Faulconer; Richard Nelson, chief, Pacific Branch; Larry Jacobs, chief, Central Branch; Jim Norlin, chief, Atlantic Branch; Paul Willis, acting chief Technical Services Branch.



Phones at their desks, finally.



GDACS Team

Standing: Darrell Hunt, Jack Allison, Dave Wagner, Jon Losee, Fred Stock, Dick Nelson, Alan Roehl, JD Marrow, Paul Willis, Bob Ford, Clay Childers.
Kneeling: Warren McReynolds, Ray Schmitz, Steve Brockshink, Ed Miska, Mike Berger, Jim Mahar, Karl Bryan.



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INTERVIEW
12

Interviewees: Phil Gruwell, Tam Bui, and Steve Maness

By Lisa Mighetto
November 19, 2004
Portland, Oregon

Lisa Mighetto: This is the HDC interview, Portland, Oregon, November 19, 2004. I suggest we start out by having both of you introduce yourselves briefly. Talk about how you came to work for HDC and what you do here. And if you could, since you're both men [Maness entered the interview late], when you start speaking if you could say your name so that there's no confusion.

Phil Gruwell: All right, although he's the one with the accent.

Lisa Mighetto: In this case it should be easy to differentiate on the transcript.

Phil Gruwell: This is Philip Gruwell, and I first came to work in HDC in 1976. I was a student hire for the summer. So I worked summers for three years, and then I got hired on after college just to earn enough money to go to Europe, and I did that and I swore I'd never come back, which is just one of those things you shouldn't say. And when I got back I was, of course, totally broke, and so I came to work here just as a temporary – a six month temporary, and I've been here for 23 years. Well, 23½.

Lisa Mighetto: And where did you go to college?

Phil Gruwell: Oregon State.

Lisa Mighetto: Okay.

Phil Gruwell: And I have most of the time spent my time working on generators and exciters, and for a long time it was in ME2 section, Major Electrical Equipment, which, of course, no longer exists. But I've been doing basically – except for when I was working summers – I've been doing basically the same work all that time. Although when I was first hired, actually it was to do specifically governor drawings for Bonneville 2 powerhouse when they were trying to get that done. It was a big push. Everyone was working mandatory overtime, and so they hired me on to help with that.

Lisa Mighetto: Okay. And Tam.

Tam Bui: My name is Tam Bui. I started working for HDC in May 1991. Like Phil, ME2. I started out as a summer student. I worked

for two summers. After I earned my degree in electrical engineering, I worked as a technician because at that time there was a hiring freeze here, and after two years, being a technician, I was hired as an EIT – engineer-in-training. I’ve been working other electrical work, emphasis on generators. Once in a while I do a little bit of work on exciters, and that’s about it.

Lisa Mighetto: Okay. So you both started as a summer student. Was that a program, like a formalized program?

Phil Gruwell: There was. I believe Tam was in it.

Tam Bui: Yes, mine was a formal program.

Lisa Mighetto: So how did that work? Did the Corps come to your college to recruit, or how do you become a summer employee?

Tam Bui: In some cases HDC comes to the college to recruit students. But in my case, I got it hired through my school.

Phil Gruwell: I did, too. It was actually a work-study program, and it wasn’t a U.S. government job, which meant that it doesn’t apply toward my retirement, and at the time I also did not get paid sick leave or paid holidays.

So when July 4th would come around, I’d say, “Can I work?” So mine was – I don’t know anyone else who was in the same thing that I did. Most of have been

– they opened up that position in HDC and people applied for it.

Lisa Mighetto: And then you were an engineer-in-training later?

Tam Bui: Yes.

Lisa Mighetto: What does that mean, and what does that involve?

Tam Bui: Any time you were hired as an EIT, you begin your training period for a year to a year and a half. That’s what they call the EIT, engineer-in-training, and during that time they send you to different projects and different offices so you can learn.

Lisa Mighetto: Do you have any say, or do they just assign you?

Tam Bui: No, they have an EIT coordinator who schedules where you go and for how long. So you don’t have any say in the matter. Then after you finish with your EIT program, you come back to the office that hired you in the beginning.

Lisa Mighetto: Okay, and do you have a supervisor, or there’s a coordinator who took care of this program for the first year.

Tam Bui: I have a supervisor, but you deal directly with your coordinator.

Lisa Mighetto: Okay. So you didn’t think that you would stay here, Phil, initially?

Phil Gruwell: No. And I never went through the EIT program.

Lisa Mighetto: When did that start?

Phil Gruwell: It was in place for decades before I got there, but I came on temporarily, thinking I would not stay. I was just going to stay for, you know, six months or a year or something. So, of course, they wouldn’t send me through all of that training for that. And then by the end of that period, I had had enough time in grade to be qualified to come on permanently as a GS-9, in which case you didn’t need to go through the EIT program. And I didn’t want to because it would have involved traveling, and I was working as a professional musician at the time, so I wanted to stay in Portland and have time to practice every night.

Lisa Mighetto: What do you play?

Phil Gruwell: At that time I played oboe. Now I’m playing baritone saxophone.

Lisa Mighetto: Why did you stay?

Phil Gruwell: The money. I mean, you know, it pays the bills.

Lisa Mighetto: Okay. What do you think have been the major developments since you’ve been here? Have you seen changes at HDC?

Phil Gruwell: Oh, yes. A lot of changes, because, of course, I’ve been in three different

buildings. We were in the bank building when I first started – the Federal Reserve Bank Building. Then came the Old Custom House, and now Portland District, Robert Duncan Plaza, (RDP).

Lisa Mighetto: Were there partitions up?

Phil Gruwell: No. No, that was one of the interesting things, was that – that's Steve Maness, by the way.

Lisa Mighetto: So we've just had a short break, and Steve Maness is with us, and he's going to tell us briefly about how you came to work at HDC, and what you've done during your time here.

Steve Maness: Okay, I'm Steve Maness, electrical engineer for HDC. I hired on with HDC in the summer of '91, and basically answered a newspaper ad for an electrical engineer, and was called in for an interview. Dick Moore and Mark Pierce, who was the ME2 Chief, at that time, interviewed me, and I think at that time Mark Pierce actually hired me, and then they moved me right over into the power section under Dick Moore. And I worked there ever since – well, until we reorganized when we moved over to the Customs House – to Robert Duncan Plaza.

Lisa Mighetto: And when you came in we were talking about the moves, because Phil had started in the Federal Reserve Bank, and you were talking about that.

Phil Gruwell: Right. No, I mean, the whole thing was open and, you know, your desk was setting out there. You each just had one desk, and the draftsman had a drafting table.

Lisa Mighetto: And there were 100 people, or close to 100 people.

Phil Gruwell: Close to 100 people. It was a big floor, and as I recall, you know, kind of maybe a U-shape or something, so the people on the ends couldn't see around the middle part. But, I mean, basically you could see everyone you worked with all the time. There was one telephone that your boss had, and so if you needed to make a call, which mostly you didn't, you had to go over to his desk and use the phone. So you weren't getting personal calls at your desk, you know, unless it was an emergency.

Lisa Mighetto: And you didn't call the customer; right?

Phil Gruwell: No, by and large everything was done with letters, yes, which is weird, because today, of course, everything is done with email or telephone.

Tam Bui: Or you go through your chief – you have him make the phone calls and make the correspondence.

Lisa Mighetto: Back then.

Phil Gruwell: Back then you could do that, yes. So that was very different. The other thing – oh, everyone came in at the same

Close to 100 people. It was a big floor; I mean, basically you could see everyone you worked with all the time. There was one telephone that your boss had, and so if you needed to make a call, which mostly you didn't, you had to go over to his desk and use the phone. So you weren't getting personal calls at your desk....

Everyone came in at the same time. Everyone came in at 7:45 and left at 4:30 with 45 minutes for lunch....

time. Everyone came in at 7:45 and left at 4:30 with 45 minutes for lunch, except for one of my bosses came in at 8:30. I never did figure out how this one guy got to have a different schedule from everyone else. I don't know how he worked that.

Lisa Mighetto: When did flextime come in?

Phil Gruwell: It must have been about '80 or '81, right in there.

Lisa Mighetto: So it was here by the time you got here.

Tam Bui: No, I got here in '91.

Lisa Mighetto: Right, but flextime was in place.

Phil Gruwell: We had one fellow – well, it was in the Customs House, but he would always come over to your desk and start talking to you, and he'd just smoke away while he was talking to you, and he would just talk like crazy and, you know, you would be trying to get something done and he'd just be wanting to talk. And eventually you're like okay, I just have to get out of here. And so you leave, and he'd just continue talking. It was the weirdest thing. And he didn't care that there was someone else around or not. And if you just happened to wander up right then, he'd start talking to you like you were the original person he was talking to, and continue smoking the whole time.

Steve Maness: Did everybody wear ties?

Phil Gruwell: A lot of people wore ties, but not all of us.

Lisa Mighetto: You got there in '76.

Phil Gruwell: Right. But, of course, I was a student and they didn't really expect it of the students.

Lisa Mighetto: Okay, so there were still people wearing ties in '76.

Phil Gruwell: Oh, yes. But it wasn't actually mandatory. I know Varis Ratnieks told me that when he first was hired, they took him aside and told him his hair was kind of long, that he should get it cut. And it was not long. You know, by today's standards it would have been quite trim, but by those standards it was a little shaggy.

Lisa Mighetto: And yet you didn't have much contact with the outside world yet; right? I mean, you weren't interacting with customers or other agencies, or were you?

Phil Gruwell: You know, I don't really know because being a student, I wouldn't have – that wouldn't have come into it.

Lisa Mighetto: But you were here, right? I'm talking to Steve now.

Steve Maness: Yes, in '91 when I came on, people were already interacting with customers on a regular basis. Everybody had a phone. Everybody was getting those fast

XT computers, with 10-megabyte hard drives.

Lisa Mighetto: Oh, you said '91. I was thinking earlier than that.

Steve Maness: No, '91 was later. It was pretty well – the common way of doing things like we do now and was pretty well established at that point.

Lisa Mighetto: So you're the one who has seen major changes.

Phil Gruwell: Yes, because there were no computers. We had calculators that came in not too long before I started working here, and I still have the original calculator that we had.

Lisa Mighetto: Oh, you kept it?

Phil Gruwell: Yes. It still works fine.

Lisa Mighetto: Was it like an HP, one of those hand-held?

Phil Gruwell: Yes, HP-45. And it still works – it works great. So, you know, and that was a big deal because then you didn't have to use slide rules.

Lisa Mighetto: So people were excited about getting that.

Phil Gruwell: Oh, there were people who were just like obsessed with calculators and some still are. But yes, a lot of people. I mean, it was an engineering office. Of course, everyone is going to be very interested in that.

Lisa Mighetto: Was the same kind of reception given to computers? Was everybody real enthused?

Phil Gruwell: No.

Lisa Mighetto: Okay.

Phil Gruwell: All of the younger people liked them a lot, you know. They were very cool.

Lisa Mighetto: Do you remember being introduced to computers?

Phil Gruwell: Well, at first just – I think like just the draftspeople got them, and they were using them for CADD drafting. And then they started kind of – I think they just bought one for the section.

Steve Maness: Then they'd have a shared computer for the section.

Phil Gruwell: Right. Yes. And so you'd go over and use it if you had some specific program you needed to run on it.

Steve Maness: For example, if you needed to type up a memo or something along that line.

Phil Gruwell: And so – of course, it spread out so everyone got them, but not everyone used them, even after they got them. And so there were a couple of old-timers who used the monitor as a bulletin board to put up little sticky notes.

Lisa Mighetto: And eventually did they come around?

Phil Gruwell: No, eventually they retired.

Lisa Mighetto: And was training offered? It must have been daunting to see –

Steve Maness: I'm sure some training was, but not everyone had training.

Phil Gruwell: Yes, because we went to training on LOTUS 1-2-3.

Steve Maness: Okay, yes, software training.

Phil Gruwell: Yes, software training.

Lisa Mighetto: Oh, okay.

Phil Gruwell: And all of it was useless. I don't remember any of that training that was worth the time we spent on it.

Lisa Mighetto: So the way to learn was to –

Phil Gruwell: Get on it and try it.

Steve Maness: But you're of the type that would get on and figure something like that out, whereas some folks can't do that. They have to be told how to use stuff like that.

Phil Gruwell: Mostly engineers, though, like to get onto it. I mean its new technology.

Steve Maness: They like to experiment with it.

Lisa Mighetto: Well, and once you can see the applications for

your field and how it opens up possibilities –

Phil Gruwell: Right. And then we got Internet connections, and then you could surf all day rather than actually working, and that was – that was a big change.

Lisa Mighetto: So the computers were here by the time you got here, Tam.

Tam Bui: Yes.

Lisa Mighetto: And so did you have your own PC when you arrived?

Tam Bui: Yes, I did. I had my own PC.

Lisa Mighetto: Okay. Because I've talked to people who say that well, there was one computer for a group of people, so now everybody has one.

Steve Maness: The only computer in the power section that had any software to speak of was a shared PC – well, none of them had CADD software. I installed it on mine, and then the shared computer was faster, so I went over and installed it on there, then I could do some CADD work over there. But I can remember they were so slow, you're busy drawing, you could make some changes and then you'd go to resize and look at a different part of the drawing and you could literally turn around and read a document or something by the time it would get done, it was so slow.

Tam Bui: At one point I even had my own printer.

...engineering during construction – you rely on what they send you from the project for review, and you don't know if you're getting all of the items that need reviewing, you don't know what the statuses of them are. So it would be nice to have a little better way to track this data.

Lisa Mighetto: Oh, really?

Tam Bui: Because we shared one printer, and I was joking with my boss. I told him that I'm handicapped. I don't want to walk to the printer every time I needed to print something, so he give me my own printer on my desk. Later on I gave it up.

Lisa Mighetto: That's pretty nice. Well, how important is email to your work? Was that a change?

Steve Maness: I'm trying to think when that became the norm. And even then, it took a while for some people to get on the bandwagon with using e-mail. I would say mid- to late nineties before email took off.

Lisa Mighetto: And is it important now for communicating?

Steve Maness: Oh, yes. It is used more than phone calls by far.

Phil Gruwell: Well, and the other thing is that over phone calls you actually have a record of what was said. A phone call, of course, you could have disagreements. The emails have that advantage over phone calls. And the other thing is letters used to get typed up for everything, and now you can write emails and it's much quicker.

Oh, the other thing about letters, we used to have a central typing section and so you would write out your letter longhand, or then they got those little Dictaphones so you would read

it into there and then they'd type it and send it out for you, and you'd proof read it and then it would go. And then once we got computers, then everyone would type their own letters and you still had to send them in, and they'd print them out, and you would go through that same thing.

But now we have individual secretaries for the individual branches, but before there was a secretarial pool, and there was a woman who was in charge of that, Margaret.

Lisa Mighetto: Ball?

Phil Gruwell: No, sorry it was Martha Plaster, who was very strict. And if you could ever find any error that was made – because she would proofread everything that came through – if you could ever find an error that got through her, it was like a big thing because it was like wow, look. But she was very good, so everything that went out of the office you knew was going to be accurate.

Lisa Mighetto: Who proofreads it now? Who proofs your correspondence?

Phil Gruwell: You have to do it yourself. And by and large now you do things by email, or like these systems for tracking drawings, but you don't even use letters or emails or anything. You just use the system. And there aren't the checks and balances – there aren't the checks that there used to be.

Lisa Mighetto: Who were you corresponding with earlier? Customers?

Phil Gruwell: With contractors by and large. That's where most of our correspondence would be, sometimes with our customers, the projects and the districts, but most of the letters that I wrote, I was mostly doing technical review of contracts. And so it was getting back to the contractor, letting him know what was right and what was wrong, that kind of thing.

Steve Maness: That still is done mostly longhand through review comments now. There are still submittals and the review process. You can make communications, and a lot of that is done with email or on the phone, but the actual official transfer of information is still done on paper.

Lisa Mighetto: When you award the contract maybe? Is that what you're talking about?

Steve Maness: No, during the review process.

Phil Gruwell: Except we were getting - we had this system called RMS.

Steve Maness: "Dr. Checks"

Phil Gruwell: Well, "Dr. Checks" is for specifications.

Lisa Mighetto: What's RMS?

Phil Gruwell: I don't know what it stands for?

Steve Maness: RMS is Resident Management System and we use it for punch lists and things that need to be finished by the contractor, also for QA. Also, it's a tracking system for contract submittals.

Phil Gruwell: But all of our drawings are tracked through that now, and that is the only method of interfacing with the contractor on drawings. So when it comes in, you give it an approval code, and you write out any comments that you have in a little box that it gives you, and then you set the date sent back to contractor, and you hit the key and off it goes into the other.

Lisa Mighetto: Is it like an FTP site where everybody can get on?

Steve Maness: I've only used it for the punch list that we had done in Jacksonville - for example, they didn't have termination markers on cables, or they didn't have something grounded, and I would go back and type the item into RMS and it would show up as a punch item that they needed to correct before a certain deadline, and before they could run this piece of equipment, this work had to be done.

Tam Bui: It's a tracking system to track the submittals when they get it, when they send it out, how long will it take, and what is the status; approved or disapproved.

Lisa Mighetto: There must be hundreds of drawings, right?

Steve Maness: There can be.

Steve Maness: I wish more people did that in a way. I mean, everybody shies away from these new things - RMS and whatnot.

Lisa Mighetto: So RMS is a new thing.

Steve Maness: Yes, in the last two or three years.

Phil Gruwell: Right, yes.

Steve Maness: Using RMS - I can see where it would be a lot easier to keep track of where you are in the submittal process. Right now I'm in a couple of jobs that I'm working EDC on.

Lisa Mighetto: That you're working -

Steve Maness: Engineering During Construction (EDC).

Steve Maness: Yes, engineering during construction - you rely on what they send you from the project for review, and you don't know if you're getting all of the items that need reviewing, you don't know what the statuses of them are. I review and send my comments back, and I may or may not know what happens after that. So it would be nice to have a little better way to track this data.

Lisa Mighetto: Do you do your work from here, or do you go to the projects too?

Steve Maness: You do most of your work from HDC, although you try to make field trips whenever you can to actually see

People are retiring, and the young engineers are not hearing the information—because they're not around on a daily basis and many sit off by themselves. We need to get everybody back together so that mentoring will work.

And the way we're organized right now, people don't have that opportunity any more. They're given work to do all by themselves and they just figure okay, I'll do it this way, but it's not the way the Corps of Engineers does it, it's not the way HDC does it.

what the progress is and what the actual problems are.

Lisa Mighetto: And meet with the contractor?

Steve Maness: And meet with the people. Face-to-face is always better.

Phil Gruwell: We used to only do work primarily for Portland, Seattle, and Walla Walla Districts when I started working here. And then we became the design center for the country. Now we work with all of these districts. But all districts do things slightly differently. So it used to be we had three things we had to get slightly different and now, of course, it's for all the districts in the whole country.

Lisa Mighetto: What's an example, something that might be different between Walla Walla and Seattle?

Phil Gruwell: Well, for instance, the way they put together their specifications. Walla Walla would want all of the drawing requirements in Section H of the contract, and Seattle might want a separate technical section for drawing requirements.

Lisa Mighetto: And over time you just learned which one wants what.

Phil Gruwell: Right. And then for Portland District, they give us contracting officer representative authority so that we can actually take approval action on drawings. We are the actual ones that do that. For all the other districts, we just send

comments to the district, and then their contracting officer sends the comments to the contractor.

Lisa Mighetto: So now you have more districts than just the Northwest.

Steve Maness: Right. And every district uses a different title block on the drawings, a different way of dating their drawings. They all have a little different requirement.

Lisa Mighetto: Has there been any talk of making it more cohesive?

Steve Maness: There's supposed to be. Everybody is supposed to be using the same CADD package, the same word processing package, the same everything. But it's like herding cats. Engineers are like herding cats.

Lisa Mighetto: Well, are there other developments? I didn't give you a chance, Steve, to talk about these developments that you've seen.

Steve Maness: Well, not a whole lot has changed other than office organization since I got here. Did you guys talk about the organization at all?

Lisa Mighetto: No.

Steve Maness: When I got here, we were grouped by discipline, all the power Electricals were together, and all the large rotating equipment and control people were together, and before that, even they were divided. Structural

were together, mechanicals were together, and each of those groups had a supervisor. And then in '97 when we moved – '96 or '97, they regrouped everybody into regional areas and took a few from each discipline and grouped them all together in the Atlantic, Pacific, and Central Branches.

Lisa Mighetto: And how did that work for everybody? I've heard such varied opinions.

Steve Maness: A little rough. It wasn't too bad from the operational point of view, I suspect, but the long-term ramifications are just now starting to show up, as loss of expertise, and loss of organization.

Lisa Mighetto: Loss of organization, how so?

Steve Maness: If I want to go find some of the information on an old project, it's in the office somewhere, but through reorganizations and moving, it's hard to find that stuff, where before you knew right where everything was.

Lisa Mighetto: For the records, you mean.

Steve Maness: Yes. You knew it was in this little area here somewhere, in the power group, for example. That's where I was. If you wanted to look for something or some drawings, you knew they were in this little area here. But now it could be anywhere in the building, but the floor. There are power people throughout HDC.

Lisa Mighetto: You don't know whether it's stored in some central location or in some branch –

Steve Maness: Cubicle.

Lisa Mighetto: You don't know.

Steve Maness: So the biggest thing that we're seeing and I think management is finally starting to notice it, is the loss of expertise. People are retiring, and the young engineers are not hearing the information–, the type of work that they're working on, because they're not around on a daily basis and many sit off by themselves. We need to get everybody back together so that mentoring will work.

Lisa Mighetto: So there's a younger work force and there's not the continuity that --

Steve Maness: Well, you learn by working with the people that have the experience. And if you're not sitting with them, you don't hear conversations. A lot of information transfers just by listening in on conversations then the younger engineers realize, "Oh, that's how it's done." Oh, I remember somebody said this or that – if you don't hear that stuff on a daily basis, you don't pick it up and learn it.

Lisa Mighetto: Like when you were in the Federal Reserve Building and you were all in that big room.

Phil Gruwell: Well, I was pretty oblivious back then, but yes. You knew – you could tell

whatever was going on. On the other hand, you know, if your boss was going to chew you out, everyone was going to hear it.

Steve Maness: These cubicles aren't much better. I mean, there are low sides of the cubicles. I can hear conversations two cubicles away, and it's sometimes very distracting.

Lisa Mighetto: But what you're saying is there's not the interaction with various levels of experience.

Steve Maness: People that are working on similar work need to be in the same area so that when somebody does have a problem and they get two or three of them together and they can try to figure this out, other people kind of can hear, and need to learn that. You can pick up on things.

Lisa Mighetto: Did you all have mentors when you started out, or people who kind of guided you that were more experienced?

Steve Maness: You get put together with a group working on a job; for example, one of my first jobs was with Varis Ratnieks, he was the structural and Rick Vanatta, he was the senior electrical. I think Jack Nelson was involved. I don't remember if any mechanicals were, but I was trying to put the drawing set together, and as a younger engineer I had it in my mind how a drawing set should go together, and they kept telling me no, no it's got to be this way, it's got to be this way. And I finally figured out what they wanted, and then

it starts coming together and you can understand after having gone through that, how a drawing package gets put together, but you've got to learn it from the guys that know, and have the years of experience. And the way we're organized right now, people don't have that opportunity any more. They're given work to do all by themselves and they just figure okay, I'll do it this way, but it's not the correct way to do it. It's not the way the Corps of Engineers does it, it's not the way HDC does it.

So we need to get back, to where all the work that comes out of HDC is the same, and one package looks like the last one, so the customers know what to expect.

Lisa Mighetto: Are there efforts to address that?

Phil Gruwell: Yes and no.

Steve Maness: There are efforts.

Tam Bui: Well, okay, yes we are trying.

Phil Gruwell: Whether it's working or not, that's the question.

Steve Maness: There's a lot of effort and money going into addressing that subject, but whether the correct results will come out has yet to be seen.

Lisa Mighetto: So there's a formalized program to try to address this, or policy?

Phil Gruwell: Management is looking at options, and what they'll come up with I don't know.

Lisa Mighetto: What do you think are the most challenging things about your job?

Phil Gruwell: Besides staying awake? Well, I guess for me it's the workload at times. I mean, everything tends to be cyclic, and all of the work is doable, but when all of a sudden you have all of your jobs have something come up the same day, and you're trying to get something out or all the contractors to decide that they're going to send all of their drawings the same week, and you have a deadline then by when you have to get them back to them. But that's the hard part.

Lisa Mighetto: Why is it cyclic?

Phil Gruwell: Well, because we don't require them to give us things on a schedule. I mean, if you have - like I've got, I don't know, a dozen jobs. And so they're all going to want to send drawings in at some time, and we don't say specifically what day do they have to send them in... which happens to be the end of September, and -

Lisa Mighetto: So it's coincidental.

Phil Gruwell: It's coincidental, yes.

Steve Maness: A lot of it might have to do with when construction can occur, too.

Lisa Mighetto: Okay, that's what I was wondering.

Steve Maness: ... more in that respect ...

Phil Gruwell: Yes, and even more than when construction can occur is when funding becomes available. So if it's - it used to be at the end of the fiscal year, all of the specifications had to be done. All the due dates were the end of September.

Lisa Mighetto: Because the money was running out.

Phil Gruwell: That's when the money was running out. That doesn't seem to be the case so much anymore. But it used to be that it was just always held right up until the end of September, and then you never knew at the beginning of October if there was going to be work or not, whether we were going to get funded. So I started taking my vacations in October because I knew there wouldn't be stuff to do then.

Lisa Mighetto: And you knew September would be really hectic.

Phil Gruwell: Right.

Lisa Mighetto: Well, how about you, Steve? What's the most challenging thing for you?

Steve Maness: I would say the most challenging thing for me right now is I'm at that stage where I still have a lot to learn, and most of the people who know it are retired. So I'm considered one of the old-timers around here, just because of the way

things have worked out. But yet I get asked questions that I have a really hard time answering. So I'm always trying to go and find somebody to help me get the answer to the questions. Also, to find the right information to do my own work.

Lisa Mighetto: How about you, Tam?

Tam Bui: I believe the most challenging thing for me right now is trying to complete all the projects, on time, on schedule, and under the budget. I'm working on five or six projects at the same time. They all have a due date, so trying to make every district happy is impossible. It's difficult. I wouldn't say it's impossible, but it's difficult.

Lisa Mighetto: What happens when you go over budget? Does it depend on the project?

Tam Bui: You get yelled at by the boss. If you go over the budget, then the project coordinators [PC] have to contact the district and ask for more money. Most of the districts don't like that, so they complain to your PC and your PC gets on you.

Lisa Mighetto: Has that been the case since you've all worked here – that is, that you're very aware of budgets and the fact that you have to meet them?

Phil Gruwell: You have deadlines that are supposed to be met.

Lisa Mighetto: And a limited amount of funds, right?

Steve Maness: Well, they're usually pretty good about estimating the amount of labor that's involved. Sometimes they miss it and you end up needing more drawings than they planned on or you need more field trips than they planned on. But for the most part, they're fairly close. That's why they have periodic reviews throughout the project. So as long as you meet those periodic milestones – and you're usually fairly close, but it's tough sometimes. If the work is more involved once you get into it, it turns out to be more involved than what was planned, sometimes you try and put a big peg into a little hole and it gets difficult.

Phil Gruwell: You know, I don't recall when I first came here – well, I wasn't in a position of responsibility when I first got here, but even when I started being in charge of jobs, I don't recall the emphasis on budget that there is today. I don't recall ever coming up with an estimate for a job back then which –

Steve Maness: Somebody already did it.

Phil Gruwell: I presume my boss must have, but I don't recall his ever talking to me and saying oh, you have to make sure this gets done on time and within this budget. And the only time issues were the contractor would need to be getting the construction done on time.

Lisa Mighetto: When did that start? You're thinking you might have become more aware of it as you got more responsibilities.

..when I first started, the engineers would make a study and they'd say this is the best thing to be done on the project, and that's what would be done.

And now the way you do it is the engineers make a study and say, "Here's the possibilities, here's what they would cost, and then you send it to the economists and they say well, here's what's going to work out best economically."

Phil Gruwell: Well, right, but yes, so either my boss was doing it – that must have been what it was. But I think that – well, everyone got more concerned with money. It all started to be more run by the –

Steve Maness: By the dollars.

Phil Gruwell: – yes, and by the accountants rather than by the engineers. I mean, when I first started, it was like the engineers would make a study and they'd say this is what's the best thing to be done, and that's what would be done, you know, on the project. And now the way you do it is the engineers make a study and say, "Here's the possibilities, here's what they would cost, and then you send it to the economists and they say well, here's what's going to work out best economically."

But that's not the way – I mean, before, that's not the way it was done.

Steve Maness: No and it's not the way it should be done.

Lisa Mighetto: But the money is driving it, though.

Phil Gruwell: But the money is driving it and there used to be – I think Congress was just a little easier at handing out money than they are today.

Steve Maness: Well, there aren't so many hands reaching out for it as there are now.

Phil Gruwell: That could be.

Steve Maness: And I can't imagine how many different directions they have to feed the money out now instead of just here's the Corps of Engineers, let's give them this pile.

I agree, when I first started it might have been the same type of thing, and other people did the budgeting, but I don't recall ever having to worry about that. There were deadlines, but it was construction deadlines, not so much end of the month.

Lisa Mighetto: If you know that you're not going to make a budget and you know there's no more money, do you just put in a lot of extra hours? Does that happen a lot?

Steve Maness: You're still burning up the money faster by putting in extra hours.

Lisa Mighetto: Oh, I see. So you never work where you don't record your time.

Steve Maness: Right.

Phil Gruwell: I think it's illegal technically.

Steve Maness: In the government it is.

Lisa Mighetto: That's interesting because I'm a contractor, and we have fixed-price contracts. If we go over budget, we just – the work still has to get done, we just have to do the work. But it means that you work more then. That's why contractors are so careful about what they ask for. So that's interesting. So there is no

recourse, then. If you're going to go over budget and there's no more money, then you just stop?

Phil Gruwell: Well, you anticipate it coming if you can and pick a good place to stop, and you shelf it until more money is available.

Lisa Mighetto: Does that happen very often?

Phil Gruwell: It's happened, but not very often.

Lisa Mighetto: Because of these reviews letting everybody know that this is where we are.

Steve Maness: You know it's coming and you usually go to the district and tell them it's going to cost more money, and if they have it, fine. If they don't, then you have to pick your spot to stop.

Phil Gruwell: Right, and usually you have to come up with a reason why it's going over budget. I mean, it's not enough just to say I'm spending too much. They get quite unhappy about that.

Lisa Mighetto: I imagine.

Phil Gruwell: And, you know, if it's only going to go over a little teeny bit, then you usually do a little creative accounting work and spend the last few hours on someone else's budget, and they don't know about it. That's only if it's little scraps of time.

Lisa Mighetto: But it's interesting, it does sound like

the concern about budgets is more recent.

Phil Gruwell: I definitely say it's increased, yes.

Steve Maness: Do you have a chance to go through some of the old photo albums?

Lisa Mighetto: Yes. I've got some here. Why do you ask? Is there something in particular?

Steve Maness: I'm not exactly sure where this is all headed, but it seems to me that that type of stuff is what people are going to be more interested in. This type of stuff that we're talking about now, that's fine. But I'm just thinking if somebody really wants to read about the history of HDC, they want to know fun stuff that changed, not necessarily the business aspect of it – maybe a little bit but – that's why I was saying – asked you earlier, did people wear ties in the beginning, and the cultural changes and the way the office operated more – to relate it to Dilbert. If you can track that and all of the goofy things that happened –

Lisa Mighetto: And he's an engineer, right?

Steve Maness: Yes. A comic strip that relates to this work environment

Lisa Mighetto: Well, is there something like that that we should talk about?

Steve Maness: Well, I haven't been around long enough to know much of that, I guess.

Phil Gruwell: One thing that was very different – of course, being engineers, it was mostly a male office, and by and large the women who worked there worked in the front office and did timekeeping and typing. So here are these vast expanses of almost completely men, and they used to have like girly calendars and things on the wall, and no one really thought much about it.

And then as more women started to come into the organization, that was, of course, frowned upon.

Lisa Mighetto: Do you remember when the first women were coming in?

Phil Gruwell: I don't remember specifically because I think I was here summers for three years.

Phil Gruwell: Oh, yes, long before that. But I was just here during the summers, so then there would be long stretches when I wasn't here, and then I'd come back for a few months. And so there would be women then. But I remember Billy McLaughlin worked here. She was the computer tech, and I guess that the head of HDC at the time was Glenn Meloy, who didn't get along with her. And so he would never give her a promotion. She was a 12, and he would never give her a promotion. And one suspects it was a good deal because she was a woman and he just had a thing about that, at least at that time.

So she went over to BPA and she got her 13 then.

One thing that was very different – of course, being engineers, it was mostly a male office...so here are these vast expanses of almost completely men, and they used to have like girly calendars and things on the wall, and no one really thought much about it.

And then as more women started to come into the organization, that was, of course, frowned upon.

Also, back then, we did have people who would go out and have two martini lunches. The structural section did this on a regular basis. They'd go just down a few blocks to the Imperial Hotel where a lunch special included a martini.

Lisa Mighetto: So she left.

Phil Gruwell: She left, right. And so she was one of the first technical people who was a woman in the office.

Lisa Mighetto: I've been wondering about this because I've interviewed about 40 people, and two of them have been women, so far.

Phil Gruwell: There's more around than that. A lot of them are newcomers.

Steve Maness: Most of the women engineers and technical positions right now are fairly new.

Phil Gruwell: Yes, most of them are.

Phil Gruwell: Jan Leader has been around a long time.

Lisa Mighetto: I've heard that name.

Phil Gruwell: Yes, she might be a good one to talk with.

Lisa Mighetto: So Billy left. Was there generally much turnover? I mean, she left because she was unhappy with her situation.

Phil Gruwell: Right, and she wanted a promotion. At that time people tended to work here their entire career. We had an expression that you didn't retire from HDC, you got well when they let you out.

But yes, a lot of people started working here and retired from here.

Lisa Mighetto: Is that still the case today? Well, I guess you wouldn't know because you're still -

Phil Gruwell: I'm still here. I've been here for 23 years.

Lisa Mighetto: But you haven't retired yet.

Phil Gruwell: Not yet.

Steve Maness: Yes, I got a late start. I went to school a little later on in life, but I only worked two years before - as an engineer, I was hired on here, so I was actually a new engineer when I hired on, and I'll retire from here.

Lisa Mighetto: So people tend to stay.

Steve Maness: Well, it's good work. Every office has its problems. You're not going to find any office that has everything perfect that fits everybody. But the work - this is the first job I've had that I can remember that I didn't mind coming to work. Not that I love it, and not that I'll plan on working on after retirement, but it's not a bad place to come because the work is good. It's a variety of work, of engineering type, and you do a broad spectrum of engineering. And I think that part of it is what keeps people coming back.

Tam Bui: I agree with you 100 percent. Even though we are not like a high-tech

organization, but our work is very exciting and yet difficult.

Lisa Mighetto: But it keeps you –

Tam Bui: Exciting work.

Lisa Mighetto: And it keeps you interested.

Tam Bui: I'm still here. Yes. I like it. It's interesting. Plus we get to travel, and I like traveling. Some people don't like to travel too much. We get to travel to the projects and to the districts and to some of the contractors' sites/plants. We get to do it all.

Lisa Mighetto: Where have you traveled?

Tam Bui: I have traveled to North Dakota, South Dakota, Arkansas, Kentucky, Nashville.

Phil Gruwell: That doesn't sound like fun.

Steve Maness: I lived the last five or six years of my HDC life in Jacksonville and West Palm Beach, Florida.

Lisa Mighetto: So you must be in the Atlantic.

Steve Maness: Yes.

Phil Gruwell: That sounds better.

Steve Maness: Not really. Jacksonville's not bad. West Palm Beach, there's nothing there.

Lisa Mighetto: Do you like the travel part of it?

Steve Maness: To a certain point. Five or six or seven trips a year is fine. Any more than that, it starts eating into your personal life and you just get tired of it.

Lisa Mighetto: Typically how much do you travel?

Steve Maness: When those projects – when there was work in the Atlantic Branch, I would travel five to eight times a year, typically. And this last year I maybe traveled once, just due to lack of workload. I've traveled to the tri-city area.

Lisa Mighetto: Here?

Steve Maness: Yes, over by Spokane and back, and to The Dalles and back, and I don't consider that traveling. That's just a day trip down the road and back.

Lisa Mighetto: But you said it was due to the workload, so that's a change. So there's less work in the Atlantic Division.

Steve Maness: Right. There's less work in the Atlantic, that's funded. So there's not money available. right now. There are different methods of funding work, and the Northwest right now has a good source of funding and the Southeast needs a good source.

Lisa Mighetto: Phil, I didn't ask you what you liked about the job. You said earlier that the money kept you there. Is there anything that you particularly like about it?

Phil Gruwell: Not particularly, no. I don't like to travel either.

Lisa Mighetto: Do you travel much?

Phil Gruwell: No. I travel probably about two times a year. My boss wouldn't mind if I traveled a little bit more, but I manage to find ways of getting out of it.

Lisa Mighetto: But you're still a musician, right?

Phil Gruwell: Yes. But I have – they sent me to Norway one time, so that was kind of interesting.

Lisa Mighetto: What did you do there?

Phil Gruwell: It was a factory inspection. They were building stator coils, and so I went over to make sure that they were being built correctly.

Lisa Mighetto: How is it that HDC gets involved in projects in Norway? How does that happen?

Phil Gruwell: That was where the manufacturing plant was. The coils were going into The Dalles up on the Columbia River.

Lisa Mighetto: Oh, I see. Okay.

Phil Gruwell: And we just put it out for a competitive bid, and whoever gets it gets it. And in this case it was ABB, and that's where their factory was.

So those were very interesting, though, because you don't often get to see how factories are different in different parts of the world. Ordinarily we just see them in the US and the Montreal area of Canada. So it was interesting to see that.

Lisa Mighetto: How was it different?

Phil Gruwell: That was the cleanest factory I have ever seen. You could have eaten off of the floor. And most everything was automated. It was a very nice factory. I'm afraid it's closed down now because I can't imagine they could compete with what the labor rates are in Norway compared to the likes of Brazil or something.

But it was very nice and the people were just incredibly friendly and wanted to show you absolutely everything, and then take you around to different plants, different hydro plants around there so you could see them. It was actually a very good trip.

Lisa Mighetto: It sounds like fun.

Phil Gruwell: Better than Brownsville, Texas.

Lisa Mighetto: Which is somewhere you've gone, then.

Phil Gruwell: Right. The same thing, a factory inspection for stator coils, and the furthest most southern tip of the United States -

Lisa Mighetto: On the border.

Phil Gruwell: - on the border and it's muggy and hot, and of course, it's an area where wages are really depressed, which is why they have a factory there, and so you don't have to worry about conserving labor to do this. So everything was not automated. It was a very different thing.

They also made at least reasonable coils then. They weren't as good as the ones from Norway. So you could really tell the difference.

Lisa Mighetto: They might still be in business.

Phil Gruwell: They're definitely still in business.

Lisa Mighetto: Well, is there anything else that we should talk about? Steve, you mentioned the sort of fun, social stuff.

Steve Maness: There's been a decline in Christmas parties.

Lisa Mighetto: I heard that.

Steve Maness: HDC can't have an official Christmas party because that condones a certain religion.

Lisa Mighetto: Oh, I heard you used to have a separate one and now there's not a separate one.

Steve Maness: Well, every little group had their little corner party, and then the older engineers retired - maybe the young people just don't party like the old timers did. They don't seem to want to socialize with

each other. It's more keeping to themselves.

Phil Gruwell: I don't think they could possibly keep up.

Lisa Mighetto: So you don't have a Christmas or holiday party?

Steve Maness: Not like we used to - well, HDC does to some point, but I'm talking about the little impromptu fun parties that happened off in the corners.

Lisa Mighetto: Okay.

Phil Gruwell: Well, my boss would just say, "What do you want me to buy? I'll bring the booze. You guys bring the mixers. Just tell me what booze to buy." And so he'd bring a bottle in and we'd sit in the afternoon and drink and have our own Christmas party. Play cards or something.

Phil Gruwell: And I don't know, whoever was in charge just looked the other way, I suppose. Yes, I mean, you know from the time you broke for lunch until the time you went home that one day there was a party. And now they have a little potluck and you eat your stuff mostly in your own area, and you go back to work. But what fun is that?

Lisa Mighetto: How do you account for that change? What happened?

Phil Gruwell: I think that the type of people that used to work here in years past were a little more crazy. In other words, if they're not crazy in the head type

thing, but just off the wall and impromptu and willing to push the envelope a little bit where it seems like the younger engineers want to toe the line more, maybe. I don't know. They don't have that recklessness that the older generations had.

Also, back then, we did have people who would go out and have two martini lunches. The structural section did this on a regular basis. They'd go just down a few blocks to the Imperial Hotel where a lunch special included a martini.

Lisa Mighetto: It came with lunch?

Phil Gruwell: It came with lunch, yes. It was like a roast beef lunch with martini, and they'd go and they'd have a martini. I don't know about other people, but I have one martini and it affects my judgment. And I don't think they stopped with one. I think that was just kind of a warm-up. And, you know, then they would come back and be in a good mood.

I think that affects a lot, if the atmosphere of a place, you know, if you're kind of tipsy all afternoon – pretty jovial.

Steve Maness: The one thing that goes on right now is some of the guys meet for pizza and beer once a week. That's about the only thing that goes on anymore, and then I guess the fact that some people wear louder shirts a little more often, but that's about the only thing that would be considered "wild".

Tam Bui: We have that Wednesday lunch at Captain Ankeny's. Every Wednesday we try to go there.

Steve Maness: Does that still happen?

Tam Bui: Yes, it does.

Phil Gruwell: The other thing is that there used to be parties after work – I mean just get-togethers, and someone would say okay, it's spring, so we're going to have our "spring fling" and we'd go out to a bar after work and, you know, it was kind of a Corps group of people who would do it. But it was a lot of people that would do it, not just a few. A large group would play pool or sit around and drink or whatever they felt like after hours.

Lisa Mighetto: And now you don't do that?

Steve Maness: The NPLA still does that some.

Phil Gruwell: Oh, that's true.

Lisa Mighetto: NPLA?

Phil Gruwell: National Power Lounging Association.

Steve Maness: You haven't heard about that? I have a hat out there that says NPLA across the front of it. That's a group that's been around for eight or nine years probably, or maybe longer.

Lisa Mighetto: How does one become a member?

...they sent me to Norway one time, so that was kind of interesting. And we just put it out for a competitive bid, and whoever gets it gets it. And in this case it was ABB, and that's where their factory was. The coils were going into The Dalles up on the Columbia River.

That was the cleanest factory I have ever seen. You could have eaten off of the floor. And most everything was automated.

Steve Maness: Oh, you just show up, I think. They go once a year usually over to the coast somewhere for a weekend, and then they'll have periodic functions. They'll go to the Horse Brass Pub or they'll go to some other place maybe and just for an evening and throw darts and drink and tell stories.

Lisa Mighetto: Have you all done that with them?

Phil Gruwell: Oh, yes.

Lisa Mighetto: I wonder, could it have been the move to this building that changed things?

Phil Gruwell: I don't think it was the move to the building so much as the reorganization.

Steve Maness: Yes, it split people up.

Steve Maness: It split people up. People had formed little cliques, and you were working with people who did the same kind of work, so you're all into the same sort of thing, and you worked on it together and you've built up a camaraderie, and then you split them up and now you're sitting next to people who work on different kinds of things and you don't have that same sort of thing going on, or interest.

Lisa Mighetto: The same commonality.

Steve Maness: Camaraderie is not as good as it was.

Phil Gruwell: And people just don't drink as much today

as they did back then. Our older guys were the drinkers.

Lisa Mighetto: Or smoke.

Steve Maness: That's what I'm trying to say about the younger engineers. I don't think most of them even smoke. I mean, it's a healthier thing to drink less and not to smoke at all, but that used to seem to build camaraderie. I must admit I don't drink like I used to.

Lisa Mighetto: Well, is there anything any of you would like to add? Thank you all very much. [break] This is Phil, and we're going to hear a story about John Benjamin.

Phil Gruwell: John Benjamin, who was known as Boom Boom because of what he did at one picnic. He was very much into guns – well, cannons actually. So he brought a cannon to an office picnic, and our supervisor, the head of electrical at the time was Glenn Meloy, and he was getting . . . his 20-year pin or 30-year pin or whatever it was. And so when they announced it, John set off his cannon. Well, it's a small cannon but it makes a lot of noise. I mean, and it was, you know, a cannon going off. And so everyone jumped, and ever after that he was known as Boom Boom Benjamin.

But yes, he was a real character. He was sorry he never made it to Vietnam, and evidently he was eventually sorry enough that he made up stories that he actually had been there. And so he moved over to Portland District, though. He was gone

after a couple of years after I arrived. But yes, the cannon at the picnic – that was Boom Boom. And if you have been around HDC for any length of time you've heard the story.

Lisa Mighetto: Thank you.



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Interviewees: Marjorie Dukes and Brian Moentenich

By Lisa Mighetto
November 19, 2004
Portland, Oregon

Lisa Mighetto: This is the HDC interview, Portland, Oregon, November 19, 2004. I'm here with Brian Moentenich and Marjorie Dukes. I suggest we start out by having each of you introduce yourselves, talk about how you came to work for HDC and when, and what you've done here.

Brian Moentenich: I'm Brian Moentenich. I'm a mechanical engineer. I started work for HDC in September of 1974 – hard to believe. It's been a while. I graduated from Ohio State with a Master's Degree, and then I wanted to work back in Portland. So I fired off a whole bunch of resumes ...

Lisa Mighetto: Were you from Portland?

Brian Moentenich: Yes, from Portland. And only two companies responded, and one was the Corps and one was Tecktronics. The Corps would not fund me to come and do an interview, but Tek flew me and my wife out for an interview, which worked out good, so I interviewed anyway. And I was offered jobs at both places, and I took the job with the Corps.

Lisa Mighetto: Why did you pick the Corps?

Brian Moentenich: Well, three reasons. One, we wanted to live on the east side and didn't want to have to commute to the west side to work for Tecktronics. Two, the type of job that I would be doing looked a lot more interesting than the type of job Tek had planned for me and the starting salary was a little better. It's hard to believe, but it was at that time. Now, it's a different story. But those are the three reasons.

Lisa Mighetto: Did you start out at HDC with the Corps?

Brian Moentenich: I started out at HEDB in the Federal Reserve Bank Building at 9th and Stark, and I worked there, and I've been basically working continuously for either HEDB or HDC ever since, except for a five-month rotational assignment. So I've been in the Customs House – Bank Building, Customs House, and now RDP.

Lisa Mighetto: Okay, Marjorie.

Marjorie Dukes: Well, my name is Marjorie Dukes and I started working for HDC in March of 1985. I was a student going to high school, so I was in the Stay-in-School Program. I worked part time for the powerhouse design section. I graduated from high school and I started going to Portland Community College. I continued working part time, as a support person in the Powerhouse Design Section. Then I moved into the front office of HDC as an office clerk. When I could no longer attend school, I was hired on a temp appointment NTE 1 year which was a new position on the financial side of the house to help monitor funds received by HDC.

I was given a permanent position on the Taper Program; I had to work for three years and then I became career conditional. I worked as a support person in the front office. When my three years were complete, I became a secretary. I have been a secretary in HDC, and I went from a secretary to a budget position. I was a budget assistant in HDC for three or four years.

Lisa Mighetto: Was this the nineties by this time?

Marjorie Dukes: Yes. Late 1990s. Currently, I'm back in a secretarial position, and I have been a support person all those years in HDC. I only left HDC for a little bit to work in a Human Research office for a month or so to help them out. I've mainly been with HDC since 1985.

Lisa Mighetto: And you recently got a promotion?

Marjorie Dukes: Well, yes, I have a job for a year in a budget position job with Engineering & Construction with the Corps. (Marjorie was selected to fill this position on a permanent basis and has made that career move.)

Lisa Mighetto: And you've worked in budget. You've done budget work before.

Marjorie Dukes: I've done budget work before, yes. So it's just going back to what I know again.

Lisa Mighetto: What do you both see as being the major developments during your time here; that is, what would it be important to include in a history of HDC?

Brian Moentenich: One of the things I think is important is we have evolved from designing and building hydro plants to simply maintaining the existing ones. That has been a big change, obviously. This huge presence and awe with my first time working here with the number of civil engineers here. We probably had 120 employees, maybe more than that, and many were involved in design, new design of powerhouses, and when all the new powerhouses were built, essentially we started really repairing, maintaining, replacing turbines, replacing generators, switch gear, and the civil contingent has dwindled to two now, two civil engineers, where we probably had - I don't know how many we had at one time. We probably had 20 or 30 easily.

So they work themselves out of a job because concrete is stuff that never tears up, burns up, peels, or corrodes.

Lisa Mighetto: It was built to last.

Brian Moentenich: Built to last. Where mechanical and electrical equipment fails, burns up, is updated; more efficient equipment is available, that sort of thing. So, that's a huge change in our mission that has happened since I've been here.

Lisa Mighetto: You arrived in 1974, right?

Brian Moentenich: Yes.

Lisa Mighetto: Were you aware that this change was on the horizon when you came?

Brian Moentenich: Well, when I first arrived I didn't even know what HDC did, or [what] the Corps did. Yes, it wasn't too long after being here I realized that I was involved in the early planning stages of Bonneville II powerhouse, which was one of the last major powerhouses constructed by the Corps. I felt really lucky that I was around in the old days where we actually designed the powerhouse from the ground up, and were involved in the planning of it as well as in the design and construction, commissioning all through. So I had a great opportunity - great learning opportunity, participating in the various facets of that.

I knew that we were going to be building new dams and new

powerhouses for the foreseeable future. There are so many rivers out there to build a dam on. So yes, I knew that. But I stayed here because I really liked what we were doing, and the work was interesting, and I have seen lots and visited lots of other districts and saw what they did, and nothing appealed to me to want me to go out and, you know, work someplace else.

Lisa Mighetto: **What made the work interesting?**

Brian Moentenich: I think just all the differences – the different districts we got involved with and the different problems. Mechanics – engineers are problem solvers by nature, and we are involved in repairing – solving major problems – inefficient equipment, failures, whatever, from a mechanical perspective. And to me, it's important work. Very large pieces of equipment are expensive, big infrastructure, big investment as opposed to designing, say, a water treatment facility for a state park or something.

To me, I enjoyed doing the powerhouse work. It was more appealing to me.

Lisa Mighetto: **What were the most significant projects you worked on?**

Brian Moentenich: Oh, obviously Bonneville 2nd powerhouse and rehabilitation of the Bonneville 1st powerhouse. Snettisham was pretty significant. Libby was a very significant one; probably Lost Creek would be another one; and, more recently,

I would say Garrison, Ozark Webbers Falls.

Lisa Mighetto: **Garrison in North Dakota?**

Brian Moentenich: Garrison in North Dakota and Ozark Webbers Falls in Little Rock have been some of the more recent ones.

Lisa Mighetto: **And do you travel to the site, or do you work from here?**

Brian Moentenich: A lot of traveling.

Lisa Mighetto: **So you go out to the project.**

Brian Moentenich: Yes, and we also go to a lot of manufacturing facilities, and many of the manufacturers of the turbines and generators for that matter are offshore. So I've gotten great trips. I've been to Switzerland, and Austria, and Brazil, and Germany, and England, Canada – I don't know, there were just too many to remember off the top of my head.

Lisa Mighetto: **Talking to manufacturers?**

Brian Moentenich: France was another location. Either at a laboratory doing work, observing testing, or meeting with manufacturers in the facilities. I've done the great places. As a tourist I probably have failed, I haven't taken advantage, or toured Europe or anything like that. But I've done a fair amount of travel with my work for the Corps – HDC in particular.

... we also go to a lot of manufacturing facilities, and many of the manufacturers of the turbines and generators for that matter are offshore. So I've gotten great trips. I've been to Switzerland, and Austria, and Brazil, and Germany, and England, Canada –

... they didn't have many computers, It used to be a status symbol. I remember Ovie had a computer and never used it.

I used the typewriter, and I broke one. It was so funny, it broke, and they said it's going to come out of your paycheck. I was like, oh no....

Lisa Mighetto: And Marjorie, how about you? What do you see as the big development? You've been here since 1985, so almost 20 years.

Marjorie Dukes: Yes. The organization has changed since I started, you know. It seemed like the technology has changed because they did a lot of drafting on drafting tables, where they don't do drafting on drafting tables anymore, now it's all automated.

Brian Moentenich: With ink.

Marjorie Dukes: With ink.

Lisa Mighetto: When you got here?

Marjorie Dukes: Yes, that's what they were doing, and now they use automated systems like AutoCAD and Microstation that produce the things they used to do on drafting tables. So that's changed. And they didn't have many computers, but now everybody has a computer, and everything is just done a lot differently.

Lisa Mighetto: Did you have a computer when you first got here?

Brian Moentenich: It used to be a status symbol. I remember Ovie had a computer and never used it.

Marjorie Dukes: No, it just sat on his desk.

Brian Moentenich: He never used it. Only a few key people had them.

Marjorie Dukes: It wasn't like a lot of people had computers and the printers were big old bulky things that were real loud. So everybody didn't have computers, I don't think.

Lisa Mighetto: Now, you started out, you were a secretary at first, right?

Marjorie Dukes: I started out as a student helper, an office automation type clerk, typist.

Lisa Mighetto: So you used the typewriter when you first got here.

Marjorie Dukes: Yes, we did. I used the typewriter, and I broke one. It was so funny, it broke, and they said it's going to come out of your paycheck. I was like, oh no.

Lisa Mighetto: Did it really?

Marjorie Dukes: No, it didn't. They were just pulling my chain. We used to also have this big old monster machine that was as big as – almost like this table and a little bit bigger, all the way to the end, this big old machine they would make copies on. It was huge.

Brian Moentenich: I remember that.

Marjorie Dukes: Yes, the 2080, yes. And I had to – Varis Ratnieks was one of the technicians that used to work here, and he told me how to fix it. So I was always in there, fixing that machine so it would run. We had it for a long time. But technology has changed so much that we have these

smaller things that do the same thing.

Brian Moentenich: We also had a blue-line machine that made blueprints from drawings.

Marjorie Dukes: We had that machine that smelled really bad, those blue-line machines. It was big, too. You put the drawing in and it makes another brown-line drawing or blue-line drawing, whatever. But the organization has changed a lot. Like Brian said, we don't have as many structural engineers anymore. I guess they don't have that type of work that requires structural engineers right now, because they're into more like maintenance, and fixing what's broken, making it more efficient.

I notice that they did a little – they worked with dams, but they've gone outside, like the one job; McCook. I think it was a sewage treatment plant or something for Chicago.

Lisa Mighetto: In Chicago?

Brian Moentenich: Chicago, right.

Marjorie Dukes: That was . . . but you know the Corps is getting involved in other things besides just dams, is what I've noticed. That's what's changed.

Lisa Mighetto: Does that affect your work?

Marjorie Dukes: Well, not really, but it keeps us all busy, the work – the type of work we have.

Brian Moentenich: We do more work for others than we ever used to.

Marjorie Dukes: BPA?

Brian Moentenich: Remember Ponapi and the powerhouse we did? That was one of the more interesting ones, a little tiny powerhouse in the South Pacific.

Lisa Mighetto: Did you go there?

Brian Moentenich: No, I only made it to Hawaii three times. But Rod Wittinger went there. Not the island tropical paradise you would purposely want to go to. Not bad, but, I mean, this wasn't a typical tourist site.

Lisa Mighetto: How is it that HDC ended up doing that?

Brian Moentenich: The State Department had promised the island government, which was like a possession, I think, that they would build them this, develop their hydro potential on their island, and they finally came through with it, and they gave \$8 million to Hawaii, Honolulu District, to go build them a power plant, and the Honolulu District hired us to design the powerhouse.

So it was a little different in the fact that the money didn't come through Headquarters. So the money was directly sent to the district, and our Headquarters office was totally cut out of the deal.

So that's how we got involved in doing that work. It was very

interesting. But we're doing work for another island now. It's an Indian community in Alaska, Annette Island.

Lisa Mighetto: In Alaska?

Brian Moentenich: Yes, and the Federal Highway Department is building a road to the north end. And Fhami, who used to work here, is a bridge designer for the Federal Highway Department, and as it turned out, they had this little tiny firehouse that was right in the approach to their bridge and it was in the way and needed to be moved. And so he says well, I know who can do that. So he hired us to design and move the penstock, too – big chunk of penstock. So that was support for other agencies. That was pretty interesting.

Lisa Mighetto: And when was that?

Brian Moentenich: Well, we're still working on it, aren't we? Is Jerry Joy still working on it? We've probably been working on it for about five or six years. This is pretty unusual in that the military viewed this whole project and the road construction as an opportunity to build a pioneer road, sort of to build up their skills. So they applied for – they said we could do this, and Federal Highways said okay, do it. Put in the pioneer road that cut through the trees, and build bridges, and do all this stuff. And unfortunately, that has taken forever because they only go out there and work during the summertime, and the weather is going to be icky during the winter, and people come up for

And one of the more interesting challenges I think I had . . . was the fish barges. Both Duke Loney and I, we basically designed the very first fish barges that were run up the Columbia for an experiment.

a couple of months or two for their summer internship for the reserves, and then they're gone. So there's a lot of retraining going on, and they have been very inefficient. Plus the Army sent all their worn out construction equipment up there, and stuff is always breaking down.

They spent one (the first) year just building a base camp, you know, as opposed to a contractor that would get up there and just work around the clock, through the winter, and just knock it out.

So we've had plenty of time to do our job, which needed to be done, and then things changed. They turned out that finally the community agreed to a steeper road, a road . . . you can drive 55 miles an hour on, and then that eliminated the need for as much fill and pretty much took the powerhouse out of the zone.

So we ended up not having to move it after all, but just build maybe a retaining wall around it. But we still have to move the penstock, so that's where one of our retirees, Jerry Joy, was working on at the time, and then he retired, but he was kept on to keep working on it. So that was an interesting one. And then we do a lot of nonfederal dams – the things you would use for work.

Now, the federal developers want to put a powerhouse and a court facility, and we look at the impacts on that on our operation and our safety of our plant, that they might hold on. So there are probably 30 or 40 – federal powerhouses and Corps facilities,

so we have that mission, too, and that's always interesting.

Lisa Mighetto: And you just got back from Florida – that had nothing to do with HDC.

Brian Moentenich: No.

Lisa Mighetto: You were just assisting in Emergency Management.

Brian Moentenich: Right.

Marjorie Dukes: Also, I saw in the years that Glenn Meloy, before he retired he made sure that HDC became a center of expertise.

Well, Glenn Meloy, who used to be the director or chief of HDC, he was determined to make sure that HDC was the center of expertise. He had this – what was it – mandatory, so that we would get more types of work; correct? So that helped keep us out there. Also, I guess our work has changed a lot – drastically, hasn't it? More like we're into preserving the fish because everybody is always saying "Save the Fish."

Brian Moentenich: It's a lot more environmental in importance on the Southeast. The reservoirs become . . . areas. There's no oxygen in the reservoirs, and the water quality going downstream is low during certain periods of the month – or year, and some of our generating folks can improve that. So that's a benefit that is more of an environmental benefit, and how do you handle those benefits. It used to – that was a whole

'nother color of money, and that's been a real challenge to figure out how to do that, to try and claim those benefits in justifying projects, for example. It used to be you didn't have to.

Lisa Mighetto: So when you got here in the seventies, that wasn't the case.

Brian Moentenich: No. It was strictly building the new plants.

Lisa Mighetto: How about in the eighties when you got here?

Marjorie Dukes: They were still working on Bonneville.

Lisa Mighetto: Was this one an issue?

Marjorie Dukes: No, it didn't start – it seemed like it didn't start until the nineties.

Brian Moentenich: They always were important, but it was – the fish routers worked marvelously well as far as getting adult fish upriver. It's always been a juvenile fish being downriver where the difficult part is.

Lisa Mighetto: And you're saying HDC didn't get involved until later.

Brian Moentenich: Well, actually, we were doing fish screens. A big role we played was designing fish screens and putting them in front of the turbines to keep them out of the intakes, and put them into some sort of a transportation system. So that would have been in the 1980s.

Lisa Mighetto: Late eighties?

Brian Moentenich: Oh, yes I wasn't here that long, and I was working on the fish screens, and I was out probably in the late seventies. I started out in . . . and I was in fish-screening work, so we were doing it then.

Marjorie Dukes: Maybe that's when I was aware of it, more aware of the screens and the issues with the fish and stuff.

Brian Moentenich: And one of the more interesting challenges I think I had . . . was the fish barges. Both Duke Loney and I, we basically designed the very first fish barges that were run up the Columbia for an experiment. We rented a couple of barges and modified them, put pumps on, and did that like – let's see, we did the design in two weeks, and six weeks later they were heading upriver, and that was the very first time we tried fish barges. And then later on we started designing permanent ones that we owned, because we had to turn these back because we were just renting them.

Lisa Mighetto: Did you ever think when you started out that you would be designing a fish barge?

Brian Moentenich: No, my advanced degree was in heating and air conditioning, something I have never worked on, or in powerhouses. You never seem to work in the job you were trained for. I never had a turbo machine request in my life . . . time on turbines.

A big role we played was designing fish screens and putting them in front of the turbines to keep them out of the intakes, and put them into some sort of a transportation system. So that would have been in the 1980s.

I guess our work has changed a lot – drastically, hasn't it? More like we're into preserving the fish because everybody is always saying "Save the Fish."

... becoming part of the district was a big confident move on our part, ... they basically are looking out for our needs and it provides a lot of support that we never got as part of the division. And the division didn't know what to do with us. We were left alone. Basically, we didn't have a voice in the system.

Lisa Mighetto: Marjorie, what did your budget work involved?

Marjorie Dukes: Well, we had a \$5 million budget, so pretty much what I did was manage the money that came in. I let them know where we were in our spending, talked with the customers if we needed more money. I just worked with the financial end of that.

Lisa Mighetto: So you were the contact for the customer.

Marjorie Dukes: I was one of the contacts, and there were four other managers that were contacts also with the customer.

Lisa Mighetto: Did you do this by phone, or did you go out to the project?

Marjorie Dukes: No, I did most of my work by phone. I was in the office, so I didn't go out. I think I only went to one project, I think Bonneville. I went out to Bonneville to see what – because I'm not an engineer, but they took me out to Bonneville on a day trip once to look at the coils. And they had a thing, the incinerator or something opened, we could crawl in there and see, so I got to go see that. So that was really interesting. So you had words and a picture to go with it, what it really was. So that was an interesting trip for me.

Lisa Mighetto: It helps to see it.

Marjorie Dukes: Yes, it does. It does. You're like coils? What's that? But they have models in the

office, some stepped up, messed up parts, you know . . . junk, but you can say this was a coil, you know. This is what it looks like, and we have pictures of turbines and how they look in the inside. It's like sliced down, and you can see, you know, so you can see . . .

Lisa Mighetto: How it works.

Marjorie Dukes: . . . yes. You don't really know how it works. But you can see.

Lisa Mighetto: Of all the jobs that you've had here, what have you liked the best?

Marjorie Dukes: I would say the budget job. I like the support job, too. It's just changed a lot.

Lisa Mighetto: How has it changed?

Marjorie Dukes: Well, we just have more demands, more things that we're required to do. It's more complicated. Maybe it's just who I work for. Maybe it's me that makes it more complicated, but it seems like it's more complicated. I have a lot of people I have to provide services to. We have CEFMS to deal with. It's a program, a certain financial management system, but it's a little tough to get things done sometimes because you need so many people in there to do certain things. You can start it, but it's not done until this person signs off or this person signs off. You've got to go through the process. We have a lot of processes in our office. Many get too bogged down and the process doesn't run too smoothly.

Lisa Mighetto: Is it they're increasing?

Marjorie Dukes: Well, It's kind of like at a standstill right now. It's the same old work, except you just have more of it.

Lisa Mighetto: Is that because of reduction in staff?

Marjorie Dukes: No. I think since we became part of the district the work has changed a lot more. That's what I think. I don't know if you saw that, Brian, from the engineering point of view. I just thought it was more ...

Brian Moentenich: I saw it as being different. I think moving, becoming part of the district was a big confident move on our part, although our organization fought it. They thought it would be a bad thing for our organization. But we're way better off now than we were. We used to be part of like a branch off of a division.

Lisa Mighetto: Why is it better to be in the district?

Brian Moentenich: Because we have ... basically looking out for our needs and it provides a lot of support that we never got as part of the division. And the division didn't know what to do with us. We were left alone. We liked it that way, but we didn't have a seat at the table when it came to the decision making as far as RIFs or floor-space requirements. Basically, we didn't have a voice in the system.

Here, Curt Faulconer pretty much negotiated that our director sits up with the other branch

chiefs, and we do have a voice. We do have a seat at the table. We have some control over our destiny, and yet we've been left alone. We've been left intact, and that was a concern. There was a lot of concern that oh, we'll just be kind of merged into the organization. We'll lose our identity, and that hasn't happened at all. We've got the best of both worlds, and a good one.

The other thing, of course, I think, is – the big change is the way we weigh our various rehab reports ... It used to be we did all this rehabilitation work. The money was flowing. The Congress was approving money, we were spending it, we were doing the rehabilitations, and probably about seven years ago that stopped, and the only real work going on is in the Pacific Northwest, funded by EPA directly ... has control over it. So I think that's been a big change for us.

There's an awful lot of deferred maintenance, major maintenance going on ... not getting any money, or very little of it is going on that needs to go on, that years before would have been – the investment would have been there. But money is very, very tight in every – as far as investment in the infrastructure, outside of ...

Lisa Mighetto: Is that a concern?

Brian Moentenich: Yes it's a concern. It's not unusual to have the entire plant out of service for a long time. We have machines

that have been broken for years, and they still – they sit there idle. They're idle now. They've got two dead machines, been dead for a couple of years. Webbers Falls said that machine is going to be out until –

Lisa Mighetto: What's the Falls?

Brian Moentenich: Webbers Falls. The hydro plant in Oklahoma. This was unheard of, that wouldn't have happened before.

Lisa Mighetto: Due to funding problems.

Brian Moentenich: Yes. Congress basically is just funding the ongoing hydro rehabilitation work.

Lisa Mighetto: Well, I see people are lining up. Unfortunately, we were scheduled only for half an hour. Is there anything that either of you would like to add?

Marjorie Dukes: I guess I watched everybody – I came in as a baby, and now I'm the old lady. Everybody has moved on or retired or whatever, so it's a lot of change, a lot of new faces. Everything is just a lot different. There are not a lot of people who were here when I started still here. They've retired or gone. So it basically is constantly changing.

Lisa Mighetto: Are there more women? You're the second woman I've talked to.

Marjorie Dukes: Well, yes, a few. They're younger and they

haven't been here as long as me, most are newer engineers in the office.

Brian Moentenich: There used to be, I think, on the technical side the women tended to be mostly like electrical, and I'm not sure why that was. But now there are a lot more mechanical women engineers and structural women engineers. You know, I think mechanical is sort of – I don't know, it may be because boys and girls – the boy got to work on the car with Dad and the girl didn't get that opportunity, and I think that's changing. And it probably was one of the last ones to change.

No, I think HDC is treated almost like a separate corporation. We bid on jobs like a private corporation, we have no centralized funding, and we're left alone, and it's great – I think it's a great way to run this type of an organization, and it's like an independent business unit. So that sort of makes it a fun place to work, too. We do a lot of stuff that I think a lot of people can't do.

Lisa Mighetto: Well, thank you both.



Central Branch

Front row: William Elam, Glenn Woodward, Tam Bui, Darilynne Allen, and Pamela Cartwright. Back row: Brian Moentenich, Larry Rodland, Eric Holzapfel, Don Fechner, Rob Kain and Alan Christensen.



Pacific Branch

Rob Hurst, Ron Leahey, Varis Ratnieks, Jerry Joy, Dave Brady, Emiko Hanson, Jim Folgate, Russ Reynolds, Rod Wittinger, Del Kester, Dan Ramirez, Jim Gumm and Marjorie Dukes.



Brian Moentenich and family.



Marjorie Dukes.



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INTERVIEW
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Interviewees: Curtis Faulconer, Bud Ossey, and Mike Roll

By Lisa Mighetto
April 29, 2005
Portland, Oregon

Lisa Mighetto: This morning we're here with Curt Faulconer and Bud Ossey. I suggest we start by having each of you briefly introduce yourselves. Say your name and the positions that you've held in the Corps, and how long you've worked for the Corps, and when you retired.

Bud Ossey: After you.

Curtis Faulconer: Okay, well, this is Curt Faulconer. I started with the Corps in 1967 after graduating from Oregon State University, and I was on the Portland District's engineer in training program. Then I worked in design branch in Portland District, and eventually in construction division. From there I went to Bonneville Dam and helped build the Bonneville Second Powerhouse. I was there for seven years.

Lisa Mighetto: That would have been in the late seventies?

Curtis Faulconer: Yes. I left the Bonneville 2nd Powerhouse construction office in 1979 and took a temporary job in Hydroelectric Design Branch, or HEDB, as HDC was called then, where I took over one of the sections there for a few months, and I guess they liked me good enough to keep me on. I was in HDC until I retired.

Lisa Mighetto: Which was when?

Curtis Faulconer: I retired two months after April Fool's Day in the year 2000, five years ago.

Lisa Mighetto: Okay.

Bud Ossey: My name is Bud Ossey. I started my government career in 1938, working for Bonneville Power Administration on the first survey crews of the Bonneville Grand Coulee transmission line. So, that goes back a ways. And then I started in 1938, as I said, in July.

Lisa Mighetto: You don't seem old enough.

Bud Ossey: I am going to be 86 this year.

Curtis Faulconer: Amazing.

Bud Ossey: 85. Let's not make it any older than I already am . . .

Lisa Mighetto: So, you were very young when you were working for - Bonneville Power Administration

Bud Ossey: Yes, I started college and I had to drop out of school because of the Depression, and went to work, as I said, with Bonneville and stayed with them while I was going to school, and got my degree while I was in the Army. I spent three-and-a-half years in the military service with the Army Corps of Engineers, and when I got out of the service, Bonneville Power Administration wanted to hire me back at the same professional rate I was when I left.

People who worked for me before were now three steps higher, and I couldn't accept that. So, I had a nice offer from the Corps of Engineers to start HEDB, you might say. I was the first employee they had.

Lisa Mighetto: Really?

Bud Ossey: I started in 1946 in July, and my boss was C. C. Galbraith, and Mr. Galbraith was Chief of what was then the Operations Division of the Portland District. He was Bob Schunknecht and Larry Fisher's boss, and that goes back a few years. Our office was in the Pittock Block building on the mezzanine floor. I was hired as the first civil engineer in that department.

Lisa Mighetto: Did you say 1946?

Bud Ossey: Yes, 1946.

Lisa Mighetto: So, HEDB existed then.

Bud Ossey: Not really. It was officially started the next year, in 1947. When I was hired I became part of the nucleus that became HEDB in 1947.

Curtis Faulconer: They were probably just putting it together.

Bud Ossey: Yes, they were just putting it together in 1946 and I was the first civil engineer, and Larry Fisher was the electrical engineer there, along with Bob Schunknecht. And then, as we expanded and hired more engineers and supporting personnel we moved around to different places, which I imagine you'll talk about later.

Lisa Mighetto: You mean in terms of your office?

Bud Ossey: Yes, in HEDB, and then I stayed in HEDB until 1961, when Colonel Eisenmaker, the Portland District engineer, prevailed upon me to move over and start a new branch called the Resource Management Branch. And so I left HEDB. I was in a nice supervisory position in HEDB. I wasn't the head of it, but I could see that I had no future. And so I moved over and started the Natural Resources Branch with the Corps of Engineers, Portland District, and stayed there until I retired in 1974.

Lisa Mighetto: What was the first order of business at HEDB when you arrived? What did you first work on?

Bud Ossey: Our first project when HEDB was organized was the assignment of designing McNary Powerhouse. Before HEDB started, the first order of business was working on operation and maintenance of Bonneville Dam. That was my first job, was working at anything that the Portland District area needed in the way of engineering. Why, I could remember going up to the Bonneville Project, and a carrier let me down in front of the spillway gate there -

Curtis Faulconer: A crane or something similar?

Bud Ossey: A crane, yes, to inspect the leaks in the gates with water running all over the side of me there, and that's one of the things I had to do. But mainly -

Lisa Mighetto: Were there leaks? It was a fairly new dam.

Bud Ossey: There were leaks, yes. Well, this was at the navigation lock, and an interesting side story is that the navigation lock in Bonneville, which was the largest single lift lock in the world at the time, was designed by my dad. He went to work with the Corps of Engineers in 1933 when they were starting to build Bonneville Dam and Powerhouse.

Lisa Mighetto: So, your whole family was involved in Bonneville.

Bud Ossey: Well, Bonneville and engineering. My dad later became chief of transmission design in 1938 for Bonneville Power Administration. But that's another story.

Curtis Faulconer: Bud, when HEDB first started, how many employees did you guys have?

Bud Ossey: Well, we started out very small – they started hiring everybody, and we had just about three or four civil engineers doing the design work. Another Civil Engineer, Retlaw Haynes, and myself did probably 90 percent of the structural design of McNary Powerhouse.

Lisa Mighetto: And that was in the late forties?

Bud Ossey: In the late forties. And then, of course, as the workload expanded we hired more electrical, mechanical, and hydraulic engineers. We also hired architects, as we established our office. There were probably oh, I would say 30 or 40 engineers and architects. Chet Scott came to work for us as an expert in turbine design. *(Note: Chet Scott just passed away on July 19, 2005).*

Lisa Mighetto: So, within what time period were there 30 or 40?

Bud Ossey: Oh, I would say within the year – within the year, year and a half, right in there, back to the very start.

Lisa Mighetto: So, it grew very quickly.

Bud Ossey: Oh, yes. Yes, because designing a powerhouse takes a lot of people. Curt can answer that one better than I can, because he was head of the HEDB – or HDC.

Lisa Mighetto: What was the impetus for starting HEDB? Is it because the power dams or the multipurpose dams were starting to be built on the Columbia, and Bonneville had been completed, and there was a need for it?

Bud Ossey: There was a need for it. There was an energy crisis at that time. There was a prevalent threat of extreme shortages and military reasons that were developing in Europe.

Lisa Mighetto: This was right after the war?

Bud Ossey: This was right after the war, and there was a strong need for power in the Northwest. The Northwest was growing, aluminum was in big demand. They needed power for aluminum factories at that time.

Lisa Mighetto: When you first started, did you see all this as a young, new employee, that you were part of this big –

Bud Ossey: I didn't realize that I was part of a big program, but I could see where there was a need, and I was – I realized I was part of a start of something big.

Curtis Faulconer: When it first started, Bud, was it just serving the Portland District or was it –

Bud Ossey: No, when we first became organized in 1949 as HEDB, we were assigned to the North Pacific Division of the Corps of Engineers.

Curtis Faulconer: You started in the division.

Bud Ossey: We were in division. The North Pacific Division serviced all the districts in the Northwest, but then, as you know, we became like a consulting firm for other areas because we were considered experts in powerhouse design. Although they did design powerhouses, in other divisions, I know that at times we were called on to go to other areas to act as consultants for their work.

Lisa Mighetto: When did this start?

Bud Ossey: Oh, you're asking an old man.

Lisa Mighetto: Even at the beginning then.

Bud Ossey: Not really right at the beginning because we were too tied in with doing the design of the McNary Powerhouse. Then we had Chief Joseph, and John Day powerhouses to design, as well as smaller Projects in the Willamette Valley basin. We also worked on the design of the four powerhouses on the Snake River.

Curtis Faulconer: I think the reason I asked about the Portland District is it sounded like it started with the Portland District. But starting in the division makes sense because each district has a

region that they do work for, and there were four districts in the North Pacific Division, and they needed the design branch to be in the division so it could serve all the districts. They needed people that weren't going to get a parochial view about one district over another.

Bud Ossey: No, we had constant relations with the Walla Walla and Seattle Districts.

Lisa Mighetto: But then you also consulted outside the Northwest, right? So, that would be outside the division.

Bud Ossey: Oh, yes. Yes. That wasn't on a regular basis, but on an on-call basis. When other areas needed help, they would call on us, and that was when we would go in as consultants to support other divisions.

Lisa Mighetto: Is that because of the large number of projects here, as opposed to -

Bud Ossey: No, it's because we had such a unique organization. We were the experts in the field of powerhouse design. We were recognized throughout the Corps of Engineers as the powerhouse design center. You might say the ones with the most expertise and most professional people who had the background knowledge of the intricacies of power problems that are involved in the design of a powerhouse.

Curtis Faulconer: I think also that a lot of those districts that needed to design a powerhouse just had a huge program of their

own, other work, and they didn't have a lot of experience in the powerhouse design, so they were looking for somebody who could supplement their expertise, and to find another part of the Corps that could do it was probably comfortable to them.

Some districts, when they didn't have much of a workload, would probably try to do that themselves, or hire some consultants outside. But, back in the days when Bud started and after the war, there were huge construction programs all over the Corps, and so they were just glad to have somebody to come in and help them that was part of the Corps.

Bud Ossey: I had to take trips to Texas and Arkansas, and of course, Washington on occasion.

Lisa Mighetto: Where in Texas? What project there?

Bud Ossey: Oh, golly, I don't remember. That's a long time ago. I remember the Texarkana project in Arkansas. I don't remember the names of the other projects.

Lisa Mighetto: But these were Corps projects.

Bud Ossey: Oh, yes. We did nothing outside of the Corps. These were all Corps of Engineers projects.

Lisa Mighetto: Where were you located in Portland? Did you work at the projects? Did you work at McNary or were you in Portland?

Bud Ossey: No, our office was Portland. That was - one of the things that I had a lot of issues with, with the Chief of HEDB and I felt that there should be a training program of people that we hired, that they should go out in the field and see what the field is like, and go into the other parts of the districts to see how they tied in with the work. And that was a training program was what I was recommending.

I actually wrote a letter to the district recommending that, and I got shot down, I was told we didn't have time; we were too busy. And then now, you know what they do now with the new trainees that come in. They send them out all over, getting a live perspective on what the Corps of Engineers is. And this is something I advocated and they never did it.

Lisa Mighetto: Curt, you mentioned you were in a training program when you came in to HEDB. Is that correct? Is that the kind of thing that Bud is talking about, or is that something different?

Curtis Faulconer: Well, actually, I was on the Corps' Engineer In Training program when I started with the Corps about twelve years before going to HEDB. I wasn't on exactly the kind of program Bud was talking about, but later we did have a training program every new engineer had to go through, and it varied from one year to two years at different times, and probably a year and a half was the average, and that still continues today.

So, anytime we hired an entry level engineer, we put him or her on a training program. I think the Hydroelectric Design Center still tailors a program for each person. HDC makes sure they get to experience a variety of Hydroelectric Design Center functions, get to work in all three branches, and also spend time rotating through Portland District and other districts out in the field, and sometimes in their district offices.

When I started with the Corps in 1967, I was on a year-and-a-half training program. Part of my program was in construction of work designed by HEDB, and also work designed by Portland District offices. By the way, at that time HEDB was on the 3rd floor of the Federal Reserve Bank Building.

Lisa Mighetto: So you would have started in the telephone building.

Bud Ossey: No. Just to make sure I know where we are talking about – I started in a small office on the mezzanine floor of the Pittock Block. It wasn't any bigger than from here to the wall out there, and not much wider. There was probably a dozen or 15 people in the office when I started. No, I don't even think there were even that many.

Curtis Faulconer: That was HEDB, right?

Bud Ossey: No, it wasn't HEDB yet. It was – C. C. Galbraith had been running what they called a Portland office or a Bonneville office, and that's how

I got hired in there. And then it became HEDB within the year.

Lisa Mighetto: And when did you move to the telephone building – it was the telephone building, right?

Bud Ossey: No, then we moved to the seventh floor of the Pittock Block building, and we were there for probably three or four years. And then we moved to the telephone building on Burnside, and we spent a lot of time there. And I think that's when we hired Chet Scott. Yes. And from there we moved to the third floor of the Federal Reserve Building.

Curtis Faulconer: The bank building.

Bud Ossey: Yes.

Lisa Mighetto: And that's where it was when you started?

Curtis Faulconer: When I was on my original Corps training program right out of college, I spent six or eight weeks over there working with some of the guys in HEDB.

Bud Ossey: What year was that?

Curtis Faulconer: 1967.

Bud Ossey: See, I had already moved out of HEDB then. But how long did they stay at the Federal Reserve Bank?

Curtis Faulconer: Well, I don't know. I was on the training program there, and then I was back in the district and went into

I felt that there should be a training program of people that we hired, that they should go out in the field and see what the field is like, and go into the other parts of the districts to see how they tied in with the work.

I actually wrote a letter to the district recommending that, and I got shot down....

design and construction. The next time I worked with HEDB they were in the old U.S. Custom House where the North Pacific Division headquarters was. So, sometime between 1979 and 1967 they moved over to the Custom House.

Lisa Mighetto: I think they were there at least twenty years.

Curtis Faulconer: Yes, so when I was on the training program they were in the bank building, and when I came back and joined HEDB -

Bud Ossey: They moved then from the bank building to the Custom House, didn't they?

Curtis Faulconer: Yes.

Bud Ossey: See, I never was involved in the Custom House.

Curtis Faulconer: Pretty nice facility. But perhaps a little bit too close to the division management for a design center to be located. We got asked for a lot of extra help in the division that sometimes diverted from some of mission work.

Lisa Mighetto: Is that why you were moved to the Customs Building, to be closer to division?

Curtis Faulconer: It's hard to say - they moved there years before I joined them.

Bud Ossey: No, I imagine it was because of lease arrangements with the bank. They probably - the lease

probably expired, and space became available over at the Custom House, and HEDB was downsizing, I believe, at that time, and they didn't need the room that they had there.

Lisa Mighetto: Well, Curt, you mentioned that perhaps you were a little too close to division. Did that mean that earlier there wasn't a lot of direct oversight or personal contact? How was it to work in the reserve building? Were you pretty much working independently?

Curtis Faulconer: It's hard for me to speak about HEDB before the Custom House since my experience with them was only as an EIT (Engineer in Training). But even while HEDB was in the Federal Reserve Building, the division office oversaw HEDB, and I know that having to walk back and forth took some extra time, and probably some of the division people wanted them in the same building. Being in the same building wasn't too bad except when the division had things they wanted to do that weren't powerhouse related and there was a big pool of engineers in HEDB sitting right across the hall. The division wasn't very bashful about coming down and getting us to do division work. And they would usually say, "By the way, we have no funding for this, and we also need to borrow some of your FTE (Full Time Equivalent, which was our personnel ceiling) because we're short, so you'll just have to get by without some people," and a lot of stuff like that.

Also, when somebody had retired in another part of the division office, they would often get some of our people to sit in for three or four months, and there was a lot of that, frequently leaving us short handed. Being in the same building was a mixed blessing.

Lisa Mighetto: So that didn't happen so much when you were -

Bud Ossey: We never had any of that. The division had to approve all of our work, of course. Everything had to go through the division because we were part of it, and I can't tell you how many times I went over there to have General Itchner, who was our Division Engineer at the time - part of the time - sign documents. He had to sign every drawing and document that we put out. The Division Engineer had to sign them personally.

Curtis Faulconer: I remember that from when I started there. I can't count the number of times I took drawings and other documents to the Division Commander's office, or the Division Chief of Engineering, for signatures. Being in the same building was convenient for that.

Lisa Mighetto: And where did the funding come from?

Bud Ossey: Well, the funding came from Congress.

Curtis Faulconer: Once funding was received by Corps Headquarters, if it was money that was supposed to be spent in the North Pacific Region here, it would come from through the

division office. division staffs were the ones that went back to Washington, D.C., and presented the division's budget every year, fought for the funds and got them, and managed them. And, subsequently, they would distribute the funds out to the districts.

Lisa Mighetto: So did you work with the division to develop a budget on a yearly basis, saying this is what we need?

Bud Ossey: No, we worked in HEDB to develop our budget requirements for the workload that they told us we had to do.

Curtis Faulconer: Bud, you bring up a good point there. About the time I took over, just about that time, or maybe just a little bit before that during Glenn Meloy's time as HEDB's Chief, the Corps' Washington DC headquarters and the division realized that rather than HEDB having our own budget, it should be funded by the district offices. By that time the Corps' big civil works construction programs were beginning to wind down, and from then on HEDB was going to be doing hundreds of small projects for many district offices rather than a huge new powerhouses. So, at that time, the Washington and division headquarters and HEDB worked out a deal where our funding would actually come through each district that was paying us, and we would work out our budget with the individual districts and the districts would

go back and present it to their division.

It made the budget process exponentially more complex for us, but it was better for the districts. We were working for them, and they had control over the funds that way, and it made them feel a lot better about using us. It was the right thing to do.

Lisa Mighetto: Generally, did you get the money you needed?

Curtis Faulconer: It was always a struggle, especially as the Corps' program began to get smaller every year. If the districts didn't have enough to pay their own people in-house, it was difficult for them to want to send funding to HEDB, and also they watched every penny, probably more than they were watching some of their in-house money.

Lisa Mighetto: Did that change over time, the watching every penny, or has that always been -

Curtis Faulconer: Actually, I don't know what it was like during the big projects. I think when they had a lot of huge projects and they were in a rush to get them done, they were trying to watch the money, but basically you just had to spend it and produce a good product, and everything was in a hurry. You had a fixed pool of people, and you had a fixed time to get the projects done. It really wasn't, I don't think, quite as complicated from a funding point of view back in the days of big new construction.

Afterwards, it got more complicated for HEDB. We had, during the first few years I was there, 200 to 400 small projects a year for about fourteen or fifteen different district offices. Many of those jobs were as small as \$5,000 to \$8,000 dollars total. Each one of those had its own funding document, and if you went even \$100 over, you had to go through a big process. We had about 100 people working in HEDB then, and it was hard to manage that many small projects without running a few dollars over. I mean, it was continually a mess.

Lisa Mighetto: What's an example of a small project that you might deal with?

Curtis Faulconer: Well, the district might just want to have us come up and do a little assessment of some problem they're having. That might be a couple of thousand dollar job. Or they might want us to come back and do some troubleshooting on some piece of equipment, or they might want us to do a little study on some topic like adding some fire protection to an existing system. Little jobs like that.

Lisa Mighetto: And that sounds like a big change from the days when you got a few enormous projects.

Bud Ossey: I never ran into any of that when we were there, because as Curt mentioned, at the time when we were building the big projects, we had time schedules and time limits, and we had to meet the contractual obligations. And money didn't seem to be a

The environment was never even a thought at the time, and this was something that came back to haunt us . . . we desecrated a lot of land and a lot of areas that left some pretty sad scars. And we had to go in, I know, afterwards and rectify that by doing a lot of work... unfortunately, our only concern was getting the job done.

problem at the start. I mean, we had an allocation of funds to do a job, and we never seemed to have, at the early part of it, any trouble meeting those demands.

Lisa Mighetto: Bud, when you were there, was there a sense that the enormous projects would wind down, as Curt said, that eventually there would come a time when you wouldn't be - the Corps wouldn't be constructing so much as maintaining what was there.

Bud Ossey: I never really gave that much thought because when I was there, I started, as I said, with McNary. We were working full time, doing the design of McNary, and tying in with this Walla Walla District because they had charge of doing the dam construction and design, so we had to tie our work in with then,

Then after that we had The Dalles, John Day powerhouse, and then we had the Chief Joseph powerhouse, I worked on the design of all of those, and then at the same time we got into the design of the four powerhouses on the Snake River. I worked on the design of all those powerhouses too. Then they put me in charge of designing Green Peter Foster powerhouse. We had lots of work, all these projects going on at one time. We never had any thought about an end to projects and keeping us busy.

At the time when I left HEDB, I moved over to the Portland District and organized the state of the Resource Planning Branch. I worked with the Planning

Division in the Districts. We were constantly on the travel looking for new places that needed flood control. That was the basis for building a lot of these dams, and of course, most all of the dams tied in with the development of hydropower. So, we were looking for new projects all the time.

Curtis Faulconer: I've got to agree - during the first ten years or so of my career, there was always so much work going on that everybody was very busy, and it was arms and elbows flapping, you know, everybody working fast and hard. There wasn't much at that time to cause one to think about fifteen years out in the future that the big projects would start winding down. At the time many of the big projects were finishing up, there was a fundamental change in the way that the country views projects that affect the environment coupled with the start of heavy cutbacks on Government spending.

Those things brought a rapid end to many projects that were on the books, and it started to become clear there wasn't going to be very many new large projects. It was just too difficult to get them through the process.

Bud Ossey: I'm glad you mentioned environment because when we first started all these projects, all of them were given authorization based on a cost benefit ratio formula. And if the benefit was sufficient to justify the cost that was how we went to Congress to get the authorization to get the projects done.

The environment was never even a thought at the time, and this was something that came back to haunt us because after we went in and built our projects . . . unfortunately, we desecrated a lot of land and a lot of areas that left some pretty sad scars. And we had to go in, I know, afterwards and rectify that by doing a lot of work, and it cost a lot of money to correct that, and solidify the environment. And this was something that was not taken into consideration in the early days.

Lisa Mighetto: . . . do you think that's because values changed?

Bud Ossey: Oh, definitely, and because – also because we didn't get instant expert environmentalists that came along suddenly, and threw a lot of monkey wrenches into what we were trying to do. And then there was – and they were justified, a lot of it was justified. A lot of it was not justified, but a lot of it was justified. And, unfortunately, our only concern was getting the job done, and we weren't concerned about the effect or the landscape of the environment.

Lisa Mighetto: When did you start hearing about environmental concerns, Curt?

Curtis Faulconer: That's a good question. I was just doing some thinking about this the other day. From the time I started with the Corps in the 60's, I always felt like we were a pretty good agency as far as the environment goes because I was in the hydropower area. I always thought hydropower was the

environmentally clean kind of power.

Lisa Mighetto: It wasn't nuclear.

Curtis Faulconer: It wasn't nuclear, and it wasn't burning up our fossil fuels. About the time I got out of school I was thinking that the oil wouldn't last forever. And I was thinking also that the reservoirs we created resulted in a lot of recreation for people, and also irrigation, flood control, navigation, and other benefits. When I started there just wasn't a big body of knowledge about the long-term environmental problems that these big dam and reservoir projects would cause. Of course now we are all aware of the numerous problems to the fish runs and other species resulting from changing the rivers into lakes, but back then it always seemed to me that the dams and the powerhouses were environmentally a pretty good thing rather than bad, because it was offsetting nuclear, which was big at the time I got out of school, and the use of fossil fuels, coal plants and gas fired plants which were depleting fossil fuel reserves.

Bud Ossey: Well, the environment that I was thinking about was actually during the construction of the project at the site itself. I wasn't thinking about the reservoirs. I was thinking right at the site themselves, and the access to the sites.

Curtis Faulconer: You know, that is true – I remember the Corps having come back later

to clean up numerous old construction sites.

Bud Ossey: That's what I'm talking about.

Lisa Mighetto: When did you start hearing it? You used the term, I think, instant environmentalist or instant scientist. When did you start hearing concerns?

Bud Ossey: I was being facetious. I didn't mean to put anyone down. I'm sorry. But we did have people who suddenly sprung up without any background who, because of making a lot of noise, the squeaky wheel got the oil, which causes problems and disrupts work.

Lisa Mighetto: And when did that start?

Curtis Faulconer: Well, that's a good question. By the time I joined HEDB, the Corps had moved into a period of substantially increased environmental awareness, and that's continued to increase ever since. And I think today they're very environmentally aware.

But when I started out of school, there were relatively few biologists and environmentalists in the Corps.

Lisa Mighetto: In '67?

Curtis Faulconer: Yes. In fact, Bud, who was the fellow that was the nationally known sturgeon expert?

Lisa Mighetto: Ivan Donaldson.

Curtis Faulconer: Yes, Ivan Donaldson.

Bud Ossey: He and I went to high school together.

Lisa Mighetto: Did you really?

Bud Ossey: Yes. Ivan and I were very, very close friends.

Curtis Faulconer: Back then we had some exceptional people like Ivan who were involved with biology and environmental issues that had high expertise, but we didn't have big crews of people who helped the Corps balance our efforts like the Corps does today, so that we came out with products that had real positive environmental considerations as their basis.

Bud Ossey: Ivan Donaldson, by the way, worked with me when I was chief of resource management. He was one of my biologists.

Lisa Mighetto: He was the first biologist in the Corps, at least in the Northwest.

Bud Ossey: That's right.

Curtis Faulconer: He's an amazing man.

Bud Ossey: Oh, tell me.

Lisa Mighetto: You knew him, too?

Bud Ossey: We started an astronomy club in high school together. Anyhow, the question was when the concern for environment started, and I

think it started in the early sixties, during that time of Vietnam, the hippies and such.

Curtis Faulconer: That could be right.

Bud Ossey: Because that's when I first remember – when I first went into the Resource Management Branch, I was hit with that right around 1961-62.

Lisa Mighetto: When you say hit with that, do you mean from like the outside, or do you mean – was the Corps dealing with it from the inside at that time? What was the reaction?

Bud Ossey: We were forced to deal with it because of the outside pressure, and that's what – as I mentioned, we were made aware of the deficiencies we had in our early days of construction of the projects. We weren't that concerned with the environment and the effect on the landscape and surrounding area. So, then we had to come in and clean it up.

Lisa Mighetto: It seems like the nation's priorities changed. I mean, there was a major shift in the sixties.

Bud Ossey: Oh, definitely.

Lisa Mighetto: Do you think that HEDB generally resisted, or embraced, or how would you characterize how it responded to that shift?

Curtis Faulconer: Well, HEDB was pretty lucky, because most of our work was inside of a building, you know. I mean,

HEDB wasn't designing the dams and the navigation locks and the reservoirs and all that. In those days, our work was considered to be relatively self-contained and reasonably environmentally clean. Simplified, it was "Here's a spot, put a building here, and put some generators and turbines in it." So, we weren't hit with the brunt of the efforts that the Corps went through in the sixties and seventies and eighties, you know, with complex environmental impact statements and all that kind of stuff.

Lisa Mighetto: So, you were insulated from that.

Curtis Faulconer: Not totally because we had to give our input to the district, but we weren't the ones taking the flack. The Districts were, and especially the people in the districts that were designing the pieces of the projects that were going to turn a river into a reservoir.

Bud Ossey: And relocation of the railroads, the highways. We had minor work in that area. I know how to do some railroad access design. It was for the powerhouse, and I had to do some small bridge design work connected with the powerhouse. We also had to do some design of transmission towers on the powerhouse.

I had – that's an interesting story. Professor Othus, who was my professor at Oregon State, came to work for me in HEDB after he retired. He was involved in some specific, intricate designs for us.

Lisa Mighetto: Well, Bud, looking back, what do you think are the most important developments during your time at HEDB? What should we be sure to include in the history for that time period?

Bud Ossey: Oh, my, what a question.

Lisa Mighetto: So, we're talking now about sort of the beginning through the early sixties, right?

Bud Ossey: Well, the exciting thing was seeing the monument built to the betterment for our country, and the betterment for humanity through a safe power generation, and a safe and clean power source. And it was a moneymaker for the government in that it was handled right at the time. And I was just proud – my kids were all so proud of the fact their dad was involved in building these projects, or designing them. I wasn't involved in the construction of it, but I was involved in the design of them. And it's something that I've been always very proud that I was a part of it.

Lisa Mighetto: What were the biggest challenges you faced?

Bud Ossey: Learning what to do. I came out from the Army, never looking at a slide rule or a book, except a machine gun book, or a Bailey bridge design while I was in the Army, and then trying to recapture my knowledge, from my civil engineering degree at

Oregon State, and picking up the intricacies of what are involved in designing powerhouses.

I didn't know what the inside of a powerhouse looked like when I came to work for the Corps. All I knew was basic engineering design, and the design of buildings. As you said, it's just a big building with a lot of intricacies to accommodate mechanical, electrical, hydraulic, and architectural features, and the structural engineer was the one who is responsible for coordinating all of these intricacies into one package for the design.

And so I had a lot of learning to do, and I learned, and I just thoroughly enjoyed it.

Lisa Mighetto: Did the design – the concepts change over time? Did it evolve?

Bud Ossey: I don't think so. We learned more with each project is all I can say. I know that as an example, when we designed the McNary powerhouse, there was a certain mold that we had followed from Bonneville. That was the guiding light, so to speak. Bonneville was the first project on the Columbia River, and McNary was the second one on the main stem down below, and –

Lisa Mighetto: How did you come up with the design for Bonneville? How was that done? I mean, did they look at another project? How did engineers know what to do?

Curtis Faulconer: You know, that's a great question. My whole

I was at a function one time where there was a doctor who was really berating the engineers for all of their mistakes and how things crumbled and buildings collapsed. And this one engineer who was standing there finally had enough and he says, "Doctor, that's the difference between engineers and doctors. The engineers live by them, and progress and improve on them. Doctors bury their mistakes." And the doctor never said another word.

career I've been in awe of how they could say "Well, we can just stop the flow of the Columbia River and build this mile-wide dam here."

Later I of course came to understand how they did it physically, but I never really got over my awe at the fact that they hadn't ever done anything like that before, and they just said "We can do this – this river is a mile wide, but no problem. We'll just build a dam here." It was just so amazing to me – and they did it, you know, back when there wasn't a whole lot of mechanized construction equipment. I thought it was an incredible project when I was a kid, and I still do. That project was one thing that made me want to become an engineer and work for the Corps.

Lisa Mighetto: **And it worked.**

Bud Ossey: That's the ingenuity of engineers.

Curtis Faulconer: Yes, like you say, things like that make me proud to have been part of that for my career, to be with people that are so inventive and can take on huge challenges. People that say, "I can do this. Even though it's never been done, I can do this."

Bud Ossey: We made mistakes. There's no question about it, we made mistakes. But as we went along, we recognized the mistakes and corrected them, which reminds me, I was at a function one time where there was a doctor, and it was shortly

after a disaster – well, it was the Tacoma Narrows Bridge, "Galloping Gertie." And this doctor was really berating the engineers for all of their mistakes and how things crumbled and buildings collapsed. And this one engineer who was standing there finally had enough and he says, "Doctor, that's the difference between engineers and doctors. The engineers live by them, and progress and improve on them. Doctors bury their mistakes." And the doctor never said another word. Excuse me for digressing here.

Lisa Mighetto: **No problem.**

Bud Ossey: But we do, we learn by our mistakes, and we try not to duplicate them.

Lisa Mighetto: **What's an example of a mistake that you learned from?**

Bud Ossey: Just getting features of the project – this would be more attuned to the hydraulics, turbines, to the electrical introductions, into the different systems. I'm not attuned to that. I follow the repress of the electrical and mechanicals, is what I would do in the way of a desire to accommodate them. I don't know whether I –

Curtis Faulconer: I think maybe an example would be occasionally a manufacturer of, say, a turbine would tell us they've got a slightly modified design that they think will increase efficiency, and we would work with them on it – we sometimes we would decide it's

worth a try, and occasionally it wouldn't work out.

So, we would learn something there – but meanwhile we have an installed turbine that was not running as efficiently as it could which would result in a lot of lost dollars in power revenue over a period of time. If you lose just a half a percent of efficiency on what a turbine can theoretically generate, it amounts to millions of dollars over not too long a time. And then you have to decide whether you want to change that whole turbine out at a large expense, and you get into some big-dollar economics.

Those are the kind of mistakes that we would occasionally be involved in. I don't believe HEDB was ever involved in any kind of mistakes that were catastrophic. We didn't have any major structural failures or flooded powerhouses or anything like that, at least that I'm aware of.

Lisa Mighetto: **So, it's mostly like any experimentation. Some things work, some things don't.**

Bud Ossey: Well, an example – this is not a mistake, but just increased efficiency of design as an example. When we designed the McNary powerhouse, we followed the formula and the script; so to speak, of what was done at Bonneville, and one of the things in the design was they had a generator floor, along with a turbine floor. They had a generator floor along the whole length of the powerhouse. And I got to looking at that one day,

and I didn't want to take the time during the design, but on my own time I worked up a scheme eliminating the generator floor, because it really wasn't necessary in my eye. And I took that plan in to the Chief of HEDB and recommended as a suggestion that they eliminate the generator floor in their design of future dams. From the generator down to the turbine you've got a solid stainless steel shaft there. It is about four feet in diameter, three or four feet?

Curtis Faulconer: The shaft diameters on the big Columbia River dams are about four feet.

Bud Ossey: Yes, and those big steel shafts cost several thousand dollars a foot. Several thousand dollars a foot. That plus the cost of the generator floor and the construction aspects of it itself, that plus the fact that you're lowering the roof about four or five feet. It saves a tremendous amount of money.

I brought that all into focus, and I was told it wasn't functional, it would not work. I was shot down and said get back to work and don't waste time. I was just a young engineer at that time. Future dams eliminated the generator floors.

Curtis Faulconer: What I think happens is sometimes you bring out a radical idea to somebody and others say, "you can't do that," but then after it soaks for six months or so, and they finally say, "that might work."

Bud Ossey: They did eliminate the generator floors.

Curtis Faulconer: Yes, in all the later powerhouses that were built, they eliminated a whole floor of the powerhouse building to save hundreds of thousands of dollars.

Bud Ossey: Millions of dollars.

Lisa Mighetto: After McNary.

Bud Ossey: It saved millions of dollars, yes. And I never got a cent for that recommendation.

Curtis Faulconer: Bummer.

Bud Ossey: That was a heck of a suggestion I had.

Curtis Faulconer: Yes, it was a great one.

Bud Ossey: But it never took. So, that's the idea of progress you were asking us of, and that was not a mistake. That was just development of innovative ideas, and improving on past designs. And that's how it all started. I mean, they had powerhouses in the east. You asked about Bonneville - I'm sure that they got their concept of design from other powerhouses that have been built in the past, and it just improved and progressed in support of larger scale projects. As Curt brought out, a mile wide across the river there, that's a lot of powerhouse and dam.

Lisa Mighetto: Bud, what was the work culture like when you were here? You mentioned that you were a very good friend of Ivan Donaldson and that you

ended up working with him later, that you hired a former professor. Would you describe it as close knit?

Bud Ossey: Yes. Everyone was very close friends. I mean, we worked with the electrical and mechanical and hydraulic, and we were very close. We worked very close together. We had to. I mean, we depended on each other.

Curtis Faulconer: I was in a big construction office when we built Bonneville 2nd Powerhouse, and when you have a huge project like that, and also big projects like HEDB had in the time Bud was there, where there is a huge amount of work to accomplish with a short deadline, you know everybody is working fast and hard. But even with the stress of a workload like that, it's just a lot of satisfaction to work there, very exciting, and everybody's moral is up, and it makes for a real fun place to work.

When it gets tough is when an organization goes through some periods where the work is slack and they are very short of funding. There was a period of time when Congress was sequestering funds, and, you know, it looked like you wouldn't be able to pay your people. Then morale gets down and some of the good people start leaving, and it's no fun. If you work real hard, you can still keep a pretty good place to work. But basically all that undertone of negative stuff makes people so they're not feeling as good about work as they would otherwise, and we

went through some hard times like that. The whole Corps did.

Lisa Mighetto: When did that happen?

Curtis Faulconer: Oh, about the 1980s, that whole period there. The Corps was short of money in the early nineties, and that's when we did a lot of reforming of HEDB. I can talk about that after awhile. But in trying to figure out how to get through that, how to set HDC up so that it could exist in that kind of atmosphere was interesting.

Lisa Mighetto: I was going to ask you the same questions I was asking Bud. I was keeping it roughly chronological. What do you think were the major developments during your time here, because you arrived shortly after Bud left, so you're sort of the next generation. Right?

Curtis Faulconer: Yes. Well, at the time I arrived there, which was 1979, HEDB was still involved in several big projects. We were two-thirds of the way through the construction on the Bonneville 2nd powerhouse, and there was a lot of engineering during construction that HEDB was involved in such as checking the contractor's shop drawings, and a lot of other engineering in support of the final construction.

That was a huge project - 650 million dollars overall. And HEDB at the same time was finishing the designs on the four Snake River projects - Little Goose, Lower Granite, Lower Monumental, and Ice Harbor. So, lots of activity there. All of that

work was being performed at the same time, and was probably the heyday of HDC's history.

And then, within a couple of years, all those big projects had been completed. The design on the Snake River projects and the Bonneville construction was done, and we were moving into a phase of just doing engineering support during the construction of the Snake River projects. They had also just about wrapped up construction of The Dalles and Chief Joseph powerhouse expansions about the time that I got there. I could see that within a few years those were going to be winding down on any future big projects in the Northwest, but at the same time we were starting to pick up more work for other districts.

We did a design for an additional unit at Hartwell powerhouse in Georgia, and we worked on one in Texas called Amistad. We also picked up design through the State Department -- it was out in the U.S. trust territory of Ponapei, which is out west of Hawaii. We designed a complete small powerhouse out there. We were starting to pick up stuff like that through a lot of hard effort by HEDB management. It was during that time that the funding started to decline in districts all across the Corps, and all the environmental aspects came up with big red stop signs, it was clear to me and many others that probably a lot of those future projects that were on the books weren't going to happen. That there wasn't going to be any more big projects that created

reservoirs where there wasn't one before, and there would be no future big new powerhouse jobs.

So, during those years when the Corps' district funding programs were dramatically declining, internally HEDB was realizing that we were going to have to do some big changes internally or we wouldn't survive long to support the Corps' existing hydroelectric projects.

Lisa Mighetto: Just a minute ago were you talking about the reorganization in the nineties, or is that jumping ahead too far?

Curtis Faulconer: No, this is leading up to that.

Lisa Mighetto: Okay.

Curtis Faulconer: During the times when the districts' funding was low, they didn't like the idea of the Corps headquarters in Washington, D.C., taking money and sending it directly to the North Pacific Division to give to HDC. Districts said "You're no longer building new projects. You're doing a lot of support for us with our existing projects." Each district basically wanted to have control of the funds they sent us and the work we performed for them.

During that time we realized what they were saying was true. I mean, we embraced that idea that those districts are our customers, and that they should probably fund us directly, and we shouldn't have funds for their work bypassing them and coming to us directly from headquarters. Not giving our customer districts

direct control of our funding kind of put a wall between us, because if they couldn't control the funds, they really couldn't control the work that well. If we wanted to do it a certain way and they didn't want to do it that way, but we were getting our funds from our division, we said no, and we're doing it this way.

And so I think we were often viewed as being somewhat arrogant. At the time when we were designing complete powerhouses from scratch, nobody thought that. I mean, we basically had the expertise, and we could do the best job that could be done in the country on those kinds of projects, and everyone knew it.

But later as those big projects were disappearing and our primary work became maintenance jobs for the Corps' 75 aging powerhouses, the districts which operated the powerhouses wanted more direct control of HDC's work – and we agreed with them.

Lisa Mighetto: And you're saying the district had its own ideas about how that could be done.

Curtis Faulconer: Yes, they've been operating those projects for years, and they wanted to have a say in the engineering of that. They wanted to be involved in every aspect of it. Glenn Meloy and I realized that if we didn't change and bring HDC more in tune with what those districts wanted and really gear ourselves up to satisfy them, that ultimately we would disappear. They would

work through their division's headquarters and get things changed so that work didn't come to us.

We had the expertise. We knew we could do a great job. And we did a lot of internal thinking about how we could change in a way that would allow us to best serve those customer districts in a way that would keep them satisfied with our services. About that time that Glenn and I were involved with some studies, some of which we helped to initiate, and some of which headquarters initiated, to take a look across the Corps at what major powerhouse work would be needed in the future, and what work had already been done in the past.

For example, the Corps operates I think 75 powerhouses which contain a total of about 350 generators and turbines. But nobody in the Corps could say how many of those generating units had actually had a major refurbishment in their lifetime. That is, no one knew how many generators had been rewound, how many powerhouses had serious turbine problems where they've had to replace the turbine runners, or how many transformers have failed or been rewound? Nobody had that information.

So, we did a study in cooperation with some people from some of the districts and from Headquarters, and we documented all major powerhouse refurbishment work that had been done up to that point, and based on that

information we made predictions on how much future work was going to be needed. And what we found was it was an incredible amount of powerhouse work out there that was going to be required to keep the Corps' powerhouses operating that people just hadn't been planning for.

I mean for example Bonneville 1st Powerhouse at that time was coming up on 50 years old, and all those generators were original windings that had been operating nearly half a century, which was pretty incredible.

Anyway, this study led into a bunch of additional work with headquarters in trying to come up with statistical methods of actually anticipating when these things would fail.

Lisa Mighetto: And there wasn't a precedent, right, or how many dams besides the Bonneville are 50 years old. When was this study? Was this the late eighties.

Curtis Faulconer: Some of the thinking for this failure analysis and predictive work began in the eighties and went through the middle of the nineties. It spanned about a ten-year period, and it was an evolutionary thing. We actually got quite proficient at doing a lot of this kind of analysis. What made this most challenging is that there isn't a big statistical sample – for example, there just is not very many generators in the nation or the world the size of the ones at a few of the Corps' projects.

When we first completed that big study that I mentioned where we predicted how much work was out there, we found that a huge amount of work was going to be needed within a few years. I can't remember the number, but it was multiple, multiple millions of dollars worth of work that was going to be needed. Everyone in the loop at first couldn't believe it, but the data was good and the conclusions sound. This was the beginning of the realization by the Corps' Headquarters that a systematic program was going to be needed to plan for, fund, and execute the work.

The interesting thing to me was that this study was started as a result of one district in the southeast that wanted to start their own hydroelectric design center of expertise. So, HQ decided they should gather good data to see if there was enough work to support another design center. HQ nearly established the 2nd center without the study. I hate to say it was a fight for survival, but in reality that is what it was because it turned out that there was a lot of work out there, but not enough to keep two healthy centers robust. That is, neither could have kept the expertise they needed to properly perform the work.

I tell you what, Lisa, why don't I put a couple of place markers here. Take a note down of some things I want to mention after I get done with this topic. I'd like to talk about the reorganization we did within HDC, and before that reorganization I'd like to talk about how we realized the need

to reorganize. And then I'd like to talk about gearing up for customer focus and increased coordination with districts and headquarters. That is, the kinds of things we needed to do to continue to exist assuming the customer districts had a choice of where to come for hydroelectric expertise. How we could gear ourselves up so that they would want to come to us, and how we could serve them better. That's where this is leading.

Anyway, during that period between the middle eighties and the middle nineties, and especially the late eighties, we were studied virtually every year. The division studied us to see if we had too many people. Some were FTE studies – FTE is a Full Time Equivalent personnel ceiling each organization is assigned based on funding and workload. There we were sitting in the division office while the districts were short of funds, and they're wondering why this big pool of people is over there in the division, and why they're forced to send their money to them.

So, the districts and divisions would complain to Headquarters, and someone would decide that a study of HDC was needed. I think we were studied nearly every year for about ten years. You can't imagine the drain on management resources and morale all these studies created – it just wore us down. Those studies were a symptom of a shortage of work and funding Corps-wide. The worst of this was about 1988 – a time when there was a sequestration of funding Corps-wide and all

districts' budgets were cut without warning 20 or 30 percent. It was just like a hatchet came down. And you can picture during those times how people in the districts would not be happy about sending any funds to another organization like HDC at a time when they're being forced to lay off their own folks. This was a very difficult time for HDC.

Perhaps I should mention before going too much further that it was about this timeframe when HEDB, which stood for Hydroelectric Design Branch, was redesignated by Corps HQ as the Corps' national center of hydropower expertise and they renamed us the "Hydroelectric Design Center," or HDC. This followed some of the studies HQ had us involved in which I already mentioned, plus some other independent thinking that headquarters was doing where they could see that the Corps' overall civil works program was probably going to stay down in the future. That started them thinking about how to maintain expertise in highly specialized technical areas such as hydroelectric design work.

For example, in each district there might only be enough work to support one or two experts in a specialized kind of expertise such as turbine design. In some districts, there might not be enough of such work to even maintain one expert. HQ realized that they had to form Centers of Expertise and pool the work from all districts to the Center – that would allow at least one group to have enough of specialized kinds of work to remain robust

and maintain the needed depth of expertise. As you can imagine, it was a political nightmare during that time for those of us at the bottom of the food chain, so to speak, trying to figure out how to serve others better and maintain expertise, and the districts being unhappy because they're short of funds. They didn't want to send money to any labs, any centers, any of that kind of stuff, and it was hard to blame them.

It was during that time that I think it became very clear to us that we had to do things that would make the districts want to come to us, give them service that greatly satisfied them. Treat them like they wanted to be treated. At the time we were still organized like we were during the big construction days -- we had three main branches containing eight or nine sections within HEDB, and each of those had a supervisor.

When the districts would call with a question -- say, they would ask a question about when a specific job was going to be done, and they would maybe get hold of an electrical engineer and he would say, "Well, I can tell you about my part of it, but I can't tell you about the mechanical stuff or the part of the work in the other two electrical Sections." The poor districts would have to call five or six people to find out about the status of their job, and they still couldn't get a definitive answer. And I don't remember when it was, but probably maybe right around 1990 or so, or maybe a little earlier, we set up some customer managers. We made each Branch Chief a manager for all the work in certain districts, so

if a customer called in, they could get hold of this person who was high in management. This person would collect all of the internal information. This worked great!

It seems like such a simple thing, but because we were doing huge projects in the past, we were basically organized to do huge projects, and we were trying to do hundreds of small projects after that for many Districts, and we just weren't satisfying them. We were frustrating our customers.

There was a whole evolutionary process in there where we had to actually not only change our management culture, but also the culture of all of our employees, to think of ourselves as being able to provide a service that people would want to buy from us.

Lisa Mighetto: And how did that go? Was there generally cooperation? Was there generally resistance, or was there a little bit of both?

Curtis Faulconer: It just seemed like there was a lot of resistance. Maybe resistance isn't the right word -- a lot of skepticism. I mean, we were a big organization that's old and has a lot of expertise and knows they've got it.

Lisa Mighetto: And it worked before.

Curtis Faulconer: It worked before. And districts that were short of money and didn't want to hear that you could serve them better, they wanted to use the money internally.

Somebody in HQ could have just said "we're going to just have this work done in the districts now and they can hire private engineering firms if needed," and we would have disappeared. I'm glad that didn't happen because the Corps has a huge hydroelectric system... but the expertise really doesn't exist in the private sector to provide all the expertise....

Lisa Mighetto: So, some of the resistance came from the customer.

Curtis Faulconer: Yes, and sometimes they would basically choose not to do some work that they needed to do if it meant sending money out when they could do some other work internally that they also needed to do that would pay their own people. If you're running an organization, you have to think of those things. The districts had to worry about maintaining their own internal expertise.

Lisa Mighetto: But within HDB was there general agreement that - you mentioned earlier, and then you sort of backpedaled, that this was a fight for survival. Did people realize that, and did they think okay, we've got to do this so that we can continue.

Curtis Faulconer: I think once management realized it and really started to understand the kind of things we were going to have to do, we never missed opportunities to talk to our own people about the kind of things we were going to have to do to still be around ten years from that time.

I think it was an evolutionary process, and there were some people in HDC that, just like any organization, were pretty stubborn and didn't want to change. Some of those we realized were going to retire within a couple of years, and I think we realized that this was going to be a slow culture change,

but we would make it if we stayed focused on it.

Also, we realized that we had to cultivate the people in the districts and in Headquarters, to help them understand our organization better, and the kind of things we could do, and that we were focused on efficient use of their funds, and that we could provide good products and this kind of thing. I think that was the biggest cultural change for HDC was first of all realizing what we had to do, and then realizing that it was going to take a long time to do it, and we just needed to stay focused on it, and it would eventually happen - and if it didn't happen due to external circumstances, it wouldn't be anything that we had done wrong. Just some different circumstances could have caused our organization to disappear. Somebody in HQ could have just said "we're going to just have this work done in the districts now and they can hire private engineering firms if needed," and we would have disappeared. I'm glad that didn't happen because the Corps has a huge hydroelectric system - the largest in the nation - but the expertise really doesn't exist in the private sector to provide all the expertise and good stewardship needed to maintain the system in the long haul.

Lisa Mighetto: Did the size of the staff remain pretty much the same during this, or was it reduced?

Curtis Faulconer: When I first came to the center, I think we had around 100 folks, and I've heard that a few years before

that, maybe about the time that you left Bud, I think HEDB had around 115 or 120 employees.

After that period in the eighties and early nineties, I think we were down to about 75 people, and later as workload once again increased we staffed back up a little to around 80 with about the equivalent of another 20 people provided by contract support. Since I retired five years ago, I don't know where it is now.

Lisa Mighetto: So, have you said, basically, what you wanted to say about the shift to customer focus, or focus on the district, and increased coordination with the district and headquarters?

Curtis Faulconer: What else did I have on my list? I had talked a few minutes ago about some reorganization, and that was, basically, we established a point of contact for groups of customer districts we had, and mentioned how well that worked for us.

Those guys were the chiefs of our Mechanical, Electrical, and Structural branches at the GS-14 level, and they were the first row of management down from the Chief. And those guys now had to coordinate all disciplines of work for their customer groups internally, and this was a great thing.

The problem before that was that each section could have five or six engineers working on 30 jobs at a time, multiplied by eight sections. Since each section had responsibility for only a specific technical discipline, they had a discipline focus rather than a

customer focus. How would any one of those guys at the section level know when HDC as a whole would get done with any one or all of those 30 jobs?

And so creating high level customer managers in HDC was the beginning of some real mind changes in HDC about what it took to actually coordinate all these hundreds of small jobs for a large group of customer districts. The districts liked being able to call a high level client manager, that was also the chief of one of the major groups in the center, and get answers. And those chiefs could get answers, and this also began a lot more dialogue between them. Previously there was always competitiveness between the Electrical, Mechanical, and Structural branches – especially as money got shorter. After we gave them the dual hat as client managers, they began to have to spend a lot of time working things out with each other, and that produced excellent results with our customers.

We did a big reorganization later, and I'll just lead up to that. Jim Norlin, who you interviewed already, he's a guy that was always an out-of-the-box thinker. He was a real visionary in a lot of ways. And we used him for a lot of years to help us with thinking through some of these kinds of things, and doing studies with headquarters, and he was just really good at that kind of stuff. And he helped us realize that we needed to do some thinking about the major reorganization of the whole design center, so that it was focused on all

these hundreds of small jobs, and serving large groups of customers, rather than being organized by disciplines which worked good when we had only a few huge jobs for a limited number of customers.

At the same time as this, the Corps changed its requirements for supervisory ratios. Before you could have four or five engineers working for one supervisor, but the new rule became one supervisor for ten employees or more. And if you didn't get to that, they would start canceling supervisory positions.

So, we figured that here's a chance for us to also deal with that issue at the same time we considered a major reorganization. We realized we had too many layers of management for all these small jobs. You just couldn't get an answer when you went out and asked a question about when this would be done, or how much it was going to cost. And the reason you couldn't get an answer was because nobody knew. It was just too confusing.

Anyway, we went through quite a process. We knew that to do a major change in structure, we would have to work with our own people, heavily involving them in the process so that they would have some ownership of it. But we also realized that anybody in Headquarters or a division or even some districts could raise an issue to the Chief's Office if they felt a HDC reorganization wouldn't serve them well, and that could derail us. So, we realized we had to do

a lot of interaction with all of our customers and the Chief's Office and our Division Commander, and basically make them part of a plan we came up with so that it would sail right through without good support.

We also realized that once we started the reorganization, we had to do it pretty quickly. If it dragged on for years like some of the Corps districts' or divisions' plans for reorganization, it knew it would just never get done.

Lisa Mighetto: So, how quickly was it done?

Curtis Faulconer: We did the planning for it over a period of less than a year – I'm thinking six or eight months, and that included working with customers. Every time we were out, we made sure we explained what we were thinking about doing, asked for their input, incorporated their input and then got back with them to let them know. And we spent a lot of time with the Division Commander (General Fuhrman) and the civilian Chiefs in the division office. Once everyone was in agreement, we implemented the plan immediately.

The plan we came up with was to reorganize by customers. We got rid of your Electrical, Mechanical, and Structural branches. We created a Pacific Branch, a Central Branch, and an Atlantic Branch, and we divided the customers so there was roughly the same amount of work in each group. The chiefs now would be head of interdisciplinary groups of

engineers. So, we took apart the traditional structure of HDC.

There's a lot to be said about that, but let me just say one thing that I think was obvious to us when we did that. We realized that if we took the turbine experts and separated them out so they're sitting in three different parts of HDC; we knew we would begin to lose expertise. But we realized if we didn't do that and get these guys where they could focus on a customer base, and where the customers owned this group of engineers, we realized that we probably wouldn't exist too much longer.

We also realized the districts were losing expertise a lot faster than we were going to, so that we would still have pretty good expertise in our specialty areas, and more than the districts in those areas. And so we digested all that stuff, and implemented the reorganization, and it has worked well. Our customers were a lot happier, and our branch chiefs' horizons were a lot broader. Each branch chief became almost a business center. They had the control of the budgets, the personnel, the funding for all of the work within their group of customers. And the customers knew that that was their guy – their manager for all their work.

I don't think HDC would be around today if they hadn't done that. I think they would have been taken down due to failing to provide good service, or the best service.

Lisa Mighetto: Okay, well, thank you. Well, we were joined by Mike Roll, so I wonder, Mike, if you could talk just a little bit briefly. Introduce yourself and talk about how you came to work for the Corps, and what your positions have been, and how you came to HDC.

Mike Roll: I'd be glad to Lisa. I don't think you have enough tape to cover all the positions I've been in.

I started with the Corps in 1974, and to show how good things come around, Curt Faulconer was my EIT coordinator when I came on board.

Lisa Mighetto: And that's Engineer in Training.

Mike Roll: That is an Engineer in Training. So, it's somewhat ironic and serendipitous, I guess, that 27 years later I ended up back in the organization that he had retired from just about a year before.

Anyway, within those 31 years, at this stage I've been in 14 different positions in two different districts, and worked in every major office that the Corps has – planning, engineering, operations, what was the precursor to programs in project management, and now HDC.

Lisa Mighetto: Are you the deputy director?

Mike Roll: I came into HDC as the deputy director in 2001, June 2001. Since that time I've worked with a lot of the

initiatives that the organization has been working towards in terms of establishing the concept of it, call it a vision, that sort of thing. I worked greatly with the type of structure that Curt just talked about in terms of the organizational arrangement that we have, and it has, as Curt said, proven to work exceptionally well within the environment that it had in front of it over the last handful of years.

The efforts to make relationships with the customers and those contacts were initiated, developed, grew, and have been very firmly established. The aspects of having three, call them "full-service components," within the organization to service different parts of the country have worked very well when there was a good balance of workload between the organizations, and a good distribution of expertise within the three branches.

Over the last five years, we have been experiencing some changes in that environment. As you might expect, with the older employees retiring, that expertise is waning in certain areas.

Curtis Faulconer: Let me just mention here, when we did this reorganization that I talked about, we at that time said that within five years or so we're going to have to rethink this because we knew that the workload was going to shift between regions. It turned out that some things happened to cause it to shift faster than we had envisioned. An example is the direct funding to the Corps by Bonneville Power Administration – this increased

the amount of work in the Pacific Branch so that that group's workload doubled. We also knew at that time that the work in Atlantic Branch, where we were doing a lot of major rehabilitation of projects, would begin to wind down within a few years

So, the stuff Mike is talking about, we knew would be coming. Excuse me, Mike.

Mike Roll: That's actually terrific – good comments, Curt, because it wasn't quite five years. It's been more like about seven, but we are going through that right now. The workload shifts that Curt talks about are taking place, have taken place. Pacific area work is covering two-thirds to three-quarters of the organization now, so we're doing a lot of work of across branches.

I talked about the expertise levels in the different branches being pretty equal and fairly equivalent when the first reorganization was done. But as retirements come and go, and people shift jobs and that sort of thing, it changes. And what we're finding is we've lost some of the connection on maintaining the expertise, to compensate we've put a lot of mechanisms in place to try to maintain that connection; expertise groups, things like that. They've had varying levels of success. But, basically, what we're noticing is that the upbringing of our younger folks isn't as strong as it could be. And with the workload shifts, we've been looking at modifying the organization again, like Curt said, and our model now is the regional type alignments

that the Corps of Engineers in general is going through with, an organization that has a product management oversight to it, and utilizes a pool of resources – in this case our engineering staff – to support the work that comes in.

So, we're now looking at again modifying the organization. We'll probably have to look at it again in five years or so after we get it done. But I think this is the dynamic that exists within organizations now. Organizations that don't transform and change run the risk, just like they did before, of becoming extinct if they aren't able to adjust.

So, we'll have some different relationships that we're going to have to talk to our customers about. We're going to bring some different people in. We're going to look at realigning the organization with a product management focus and a customer service focus, with a pool of engineers – electrical, mechanical, structural – that we can utilize to get the work done. And it will be another interesting transformation, probably experiencing many of the growth pains and experiences that happened the last time around.

So, that's where we're headed organizationally. I think one of the biggest things within the hydroelectric design center that I want to mention while I have the time is that in the four years that I've been there we've, of course, experienced a substantial change in the condition of the world. I came in three months before 9/11, and since then, with all the activities that are going on

around the world regarding the war on terror, there's been a lot of effort within the Corps to provide support for that.

I want to make sure that we capture in this history the involvement that HDC has had. We've had five individuals who have gone over to Afghanistan or Iraq. Two of them have gone twice on different tours.

Lisa Mighetto: Who are they?

Mike Roll: Elizabeth Hall and Duke Loney have both gone twice. Clay Fouts, who is a reemployed annuitant, has gone, Martin Monnig, who is due to return here shortly, and Linda Tompkins. So, as far as disciplines are concerned, Elizabeth and Duke – Elizabeth is an electrical engineer, Duke is mechanical, Clay is electrical engineer, Linda is a budget technician, and Martin is an electrical engineer.

In addition to that, as this support has been provided across the Corps, what I call the domino effect has occurred. Person A goes to support the war on terror. That leaves a hole where Person A was. Person B goes and fills that. That leaves a hole where Person B was. So, there has been a lot of this domino effect across the Corps.

Within HDC, that's been experienced in the director position, Brent Mahan, going up to be the deputy district commander, Portland District in 2004, for about four or five months. He then also went back to Headquarters, Washington, D.C., as the business line manager

...we started thinking about the expertise we were going to lose through upcoming retirements- the baby boomers would be starting to retire... somewhere around 20 folks or about 35 percent of our expertise in five years. As a result of those discussions, we got permission from the district to over-hire... and we hired a lot of new young folks while we still had some overlap with some of the senior guys... I think we would have gutted our expertise if we hadn't done that.

for hydropower for four months in late 2004, early 2005. That caused a leadership shift within HDC. During the first stint, we had an individual from outside the organization, Dale Mazar, come in and be the director of HDC for a short period of time. And, during a second stint, I was asked to take the leadership responsibility.

As fate would have it, more dominoes continued to fall, and as of this date, the 29th of April 2005, he's going back up to the deputy district commander position in the Portland District beginning in the middle of May for about another 120 days, and I have again been asked to sit in for him as the director.

So, we've had to weather these leadership shifts at the same time that we have been dealing with looking at reorganization, with focusing on a vision, developing certain action plans to accomplish that vision, and that's another thing I want to make sure I talk about.

Real quickly, back in May 2002 we did an off-site with a third of the organization, taking people from top to bottom away from the building for two-and-a-half days to sort out where are we going as an organization, and what do we want to be, and how do we want to get there. As part of that, we established a vision for the organization. We describe it as being "Leaders in Hydropower Engineering."

As I'm talking, I'm reaching in my wallet and pulling out a little card that covers that so you can have a copy of it. And with that,

we talk about being respected, responsive, and reliable to our customers' response, respected for our competence, and reliable product delivery. And we set a variety of goals in place regarding our people, customer satisfaction, and technical competency.

And in association with that, we identified seven action items that we wanted to pursue. They are mentoring/ developmental opportunities, quality process, technical review, efficiency/ effectiveness, design guidance, partnering, and job scoping.

There were seven different action plans that we set in place to pursue with a five-year goal in 2007 of being considered "leaders in hydropower engineering" across the industry. We already knew we were players. We wanted to be recognized as leaders. When people thought of hydropower, we wanted them to think of HDC, and we wanted them to think of it in a positive manner.

And so these action plans and these initiatives are helping us progress towards that, and to make the loop come all the way around, one of those action plans deals with the reconsideration of the organization structure that Curt was talking about needing to be done.

Curtis Faulconer: You know, some of the things Mike said - I have a lot I could talk about. But I'm going to summarize because we're getting low on time here. Before I left HDC, I also went upstairs and worked for five months as the Deputy District

Commander, and I did that with the idea that it would help HDC.

We had recently moved – I mean a couple of years before I retired -- from the division office to the district office, and we were kind of outsiders who were trying to become good citizens in a new environment. The district embraced us from a management point of view. But after being asked, I felt it would be good for our organization if I went up there and got to know all the other district managers a lot better by working directly with them on their missions. And it turned out to be a really good thing – it increased all of our understanding of each others' missions and challenges. That's along the same lines that Mike talked about.

That reminds me, when we did our major HDC reorganization, we talked a lot about developmental assignments for employees. I always wanted to make those happen, but it seems we always struggled – everyone agreed in theory, but the time never seemed to be right to the Branch Chiefs. So, I figured if I could do a rotation in the district Commander's office, perhaps the HDC staff would see more value in internal rotations.

The last two years before I retired, we started thinking about the expertise we were going to lose through upcoming retirements – the baby boomers would be starting to retire. I can't remember how many exactly, but it was somewhere around 20 folks or about 35 percent of our expertise in five years. As a

result of those discussions, we geared up and got permission from the district to over-hire. You know, we laid out our study showing what we thought our losses would be and our projected workload. We got permission to move ahead, and we hired a lot of new young folks while we still had some overlap with some of the senior guys, and I think that's been a good thing. I think we would have gutted our expertise if we hadn't done that.

I mentioned the sequestration of funds in the late 1980s and how all the districts were struggling for money. I also mentioned earlier the studies we did with Headquarters to look at all the work that was out there. Before that, it was mostly a "breakdown maintenance" mentality, where if a generator broke down, somebody would find funds to fix it but often at the expense of other work. These studies lead to a Corps-wide series of major rehabilitation projects. They also ultimately resulted in HQ's decision to establish centers of expertise of which HDC was a major one – and that decision plus HDC's internal refocus and reorganization to maximize customer satisfaction allowed HDC to remain a viable resource to the Corps.

Lisa Mighetto: Mike, you talked about the concern for the loss of expertise at HDC and also the large number of new people that you now have. Do you want to continue with that?

Mike Roll: Sure. In HDC, probably in the last five to six years, 1999 or thereabouts, we

estimate that about 50 percent of our staff is new, so that's presented an interesting cultural dynamic, and an interesting demographic dynamic within the organization. As was mentioned in some of the other interviews, our efforts to fill that knowledge gap have been extensive over the past few years. Curt talk about seeking authority to over-hire – in other words, bring in more people than we were authorized to have as a fully staffed office, so that we could fill those positions when the experienced people retired.

Lisa Mighetto: And that allows for overlap and some time together?

Mike Roll: Regarding the new people that we're bringing in, I wanted to comment specifically about the engineers in training. We have brought in probably a dozen or thereabouts, engineers in training, since 2001. The interesting demographic there is 30 to 40 percent of them are women in both significant disciplines, both mechanical and electrical engineering.

Lisa Mighetto: I have a question about that. Is there a concerted effort to get women in, or just more women are going into engineering and so more women are applying.

Mike Roll: Well, I think if you look at statistics you would see that there are more women entering the technical professions now than there were 30 years ago. And it's not just women that HDC is focusing on. When we're doing our recruiting, we're

looking for a broad diversity of folks. It just so happens that in the last three or four years we have been able to acquire roughly a third of the new folks, or thereabouts, as being female.

So, we've got that as an interesting demographic. In fact, if you were to ask some of the retirees and that sort of thing to look around at the organization now compared to what they were used to, they would probably comment on a lot of things – attire, women, flexible hours, and a whole bunch of things that have occurred.

I specifically wanted to mention about the new people, because what it does for HDC, what we've been experiencing in the last two to three years is the establishment of an organization that has a broad spectrum of people in it that cover four different generations. We have the pre-World War II folks who were having careers in the early fifties and sixties. We have the baby boomers. We have the Generation Xers – people that were born in the 1970s, and then the Gen-nexters, the group that was born in the early eighties and beyond. And it does create an interesting demographic because they have different experiences, they bring different points of view, they bring different work ethic, they bring different expectations to what a job is, what work is, what family life is, and how those different things mix together. It's an excellent blend.

Lisa Mighetto: But it sounds like a challenge. Can you give an example of, say, a generation

-- and I know you've got the generalized – Generation Nexter's point of view regarding work ethic as opposed to a pre-World War II?

Mike Roll: Work ethic? Work ethic – a pre-World War II and maybe even Baby Boomers would, from my perception, approach work ethic as “I came to the company, I'm staying with the company, the company will take care of me, I'll spend my whole career in the company, and when I'm done I depart the company.” And it works and it's good – loyalty as an aspect.

The newer generation of workers, so I'm told and so I have read – I haven't experienced it exactly in great detail yet, is that work is a place where you go to provide the opportunity to do other things in your life. The aspect, the concept of staying with the same organization, working in the same office, being in the same company for 30 years isn't on the radar screen. They have more flexibility, they're willing to move and adjust more, they're willing to take more risk in their career and their career advancement, and consequently what happens is we wonder what level of longevity we might have with some of the people that come in.

Now, on the up side, we offer an extremely dynamic program, an exceptional work environment, and great challenging projects to work on. So, I think there's a good chance they'll stick around with us for a while. But I also think a number of them are going to go expand

their careers somewhere else. That's just the nature of the game nowadays, and it's not to be unexpected.

Lisa Mighetto: So, that's kind of built into your planning, then, for long term.

Mike Roll: It's built into our thinking, at least at this point. I don't know that we've done any planning for it just yet, but certainly it's in the back of my mind. And to continue with that demographic, an interesting thing that's happening now is that we are bringing back into the organization former retirees. We now have two, but recently we had three on staff that came to work for the Corps decades ago – 40 years ago is when they were in HDC. They started their careers long before I started mine with the Corps. And so that enhances that demographic in that we're bringing that older experience back to share that knowledge with the younger people that haven't had the benefit of building a new project or something like that.

Lisa Mighetto: Who are those two people?

Mike Roll: Right now Lee Sheldon and Clay Fouts. And Bob Willis was the third one, who was back for a short period of time.

The other thing I wanted to mention that I thought of prior to our last discussion – or following our last discussion was the wide diversity of talent that we have on staff. And up until recently, we had two PhDs on staff. So, two

people with doctoral degrees, both, by the way, happen to be women.

One of them has departed for a different job, so we only have one right now.

Lisa Mighetto: **Who were the two?**

Mike Roll: Carolyn Roos is the one that was here and has left, and Lori Rux. Lori is new to the Hydroelectric Design Center, and actually finished her PhD after coming to us.

Other staff-related things that I think are important to capture include the fact that we have two academic professors on staff from the University of Portland – one mechanical and one electrical, and they come and they work with us during summertime breaks and they take that real-world experience back to the classroom and use it as training tools for their students. And the interesting part about having them on staff is that some of our folks are University of Portland graduates, and so they're watching their students, some of whom have been here a couple of decades, go through the real world work process. And, you know, I think it's an interesting dimension for them to be able to observe the fruits of their labor, so to speak, in this environment.

Lisa Mighetto: **Is that how you recruited them, that you had this tie to the University of Portland?**

Mike Roll: We've got a couple of ties to the University

of Portland through staff, and I think that had a lot to do with it, is that some of the staff members knew these folks, and also we saw the benefit of bringing academic people into the organization for temporary work. And so they provide knowledgeable experience and talent for us to use, and we provide them an experience to take back to the classroom. It works out really well.

Lisa Mighetto: **What are their names? There are two of them?**

Mike Roll: Robert Albright – Dr. Robert Albright and Dr. Murdy.

Lisa Mighetto: **So, did they then help you in recruiting their students?**

Mike Roll: Yes, on occasion. We have a recruitment announcement that goes out; they'll be aware of it, pass it around to their organization. In fact, I'm glad you asked that question because it made me think of some of the things we are doing to recruit.

We have a very dynamic recruiting program. We shake all the bushes whenever we've got a recruitment action out there, whether it's for new people or experienced people. We'll go to industry, we go to universities. Some of us will contact our alma maters. Of course, we have the local ones that are easy to get to and that sort of thing, but we'll even go to universities that have a certain focus. For example, Howard University

In our organization, we have some of the smartest people in the world when it comes to hydroelectric power design. They are national and world experts.

We work on the biggest projects in the world, or close to it. We work all across the country. We have a very dynamic training program for young people.

in Washington, D.C., which primarily, if not exclusively, services African-American students. We've been back there and done recruiting back there.

We do a lot of dynamic recruiting things. We do a lot of word-of-mouth recruiting. We've had friends of employees come and interview for positions. We've actually hired one of them.

Lisa Mighetto: What kinds of things do you highlight, or does it depend on who you're recruiting?

Mike Roll: It kind of depends on who we are recruiting. Certainly, if we are recruiting young people, we highlight the dynamic aspect of the organization. I'll tell people we work with the smartest people in the world, and I don't do that just to try and shine someone on. I do that because I think it's true. In our organization, we have some of the smartest people in the world when it comes to hydroelectric power design. They are national and world experts.

We work on the biggest projects in the world, or close to it. We work all across the country. We have a very dynamic training program for young people. We will invest 18 months in an individual, and teaching them the organization, rotating them around to other offices in the Corps of Engineers so that they get an experience for the organization, not just sitting in a cubicle doing design work. Not a lot of places that will invest 18 months in someone to start their career.

For the more experienced people – middle-level, journeymen-type-level engineers, senior-level engineers – we offer a lot of the same things in terms of, a dynamic organization, working toward being leaders in hydropower engineering, that sort of focus. You can really get engaged. You can expand your professional involvement, you can expand your technical involvement, and you can be influential in making significant changes to a very important resource.

Lisa Mighetto: When I was here – it must have been in March – there was something called HDC University going on. What is that?

Mike Roll: It's one of the many mechanisms that we have in place to share expertise across the organization. Some of our mechanisms are discipline focused, like we'll have a group of mechanical engineers or a group of turbine engineers or electrical folks. HDC University is a little broader in that it's a generic kind of educational forum where, roughly once a month, someone will come in, someone from the staff or maybe another organization in the Portland District Office will come in and give a presentation on a job they're working on, or other areas of interest. And so they're sharing that knowledge with whoever else wants to sit in the room.

So, we get our mechanicals, and our electricals, and sometimes our administrative folks will come in and listen to that. Sometimes people from

outside HDC, Engineering or Operations Division for example, will come in and listen because they happen to be interested in that particular subject. And so it's just one of those kind of low-key but very effective informal training sessions that takes an hour to two hours, about once a month.

Lisa Mighetto: Who organizes it?

Mike Roll: Brian Montenich, who is our senior mechanical engineer. He's been with the organization a little over 30 years. He came up with the concept a couple of years ago.

Lisa Mighetto: And it's well attended?

Mike Roll: It's pretty well attended. Of course, it depends on the subject. There could be as few as six or eight people there. I've seen it as full as 30 to 35 people, to where people are sitting on garbage cans, and standing in the corner, and sitting on the floor so that they can see.

Lisa Mighetto: Can you describe a typical day? Is there such a thing? What do you do?

Mike Roll: A typical day. You know, whenever I get this question, I usually go get my calendar and just go through a week. A typical day for me as deputy director of the Corps of Engineers is focused on three things: leadership, management, and supervision.

I'll start with the third item – supervision. I have a small

staff of eight to twelve people, depending on how many engineers in training we have, and its day-to-day supervisory oversight type things. Any one of them may come in to talk to me about something going on with a particular project. Our budget analyst may come in to talk to me about development of the operating budget, or some questions on how we want to handle the overcharges on a certain job, something like that.

My specifications people may come in to give me some details on a particular specifications package that they're working on, or a training session that they're setting up for a specifications software program that we're looking to implement.

My chemist may come in to talk to me about a training class that he is presenting, or ask me to review some technical paper that he's prepared.

My two senior technical folks, mechanical and electrical engineers, might come in to give me quick background on a job they're working on, or ask my advice and guidance on some potential program that they're working up, things like that. I've got a clerical person who may come in to share with me some particular aspect of a support job that they're working on.

So, it's day-to-day basic supervision oversight, with all the things that come with it.

Managerial responsibility – as deputy director, sometimes I get referred to as the chief executive

officer of the organization. I interact regularly with the rest of the managers, with the senior technical people on what's going on in the organization on a daily basis. So, I oversee a lot of the support for our human resources management needs, whether its employee actions, recruitments, things that are going on, work coordination aspects between branches, driving the focus toward our vision, that sort of thing. Just a broad spectrum of managerial actions that deal with the organization and the people in it.

And then the third leg of the stool is leadership, and that's where I work together with the director to support the focus towards our vision of being leaders in hydropower engineering, the development of the supportive action plans that we put in place, meeting with the team leads on those action plans to assess progress, determine what we're going to implement, what we're not going to implement, that sort of thing.

Lisa Mighetto: Do you travel much?

Mike Roll: Me, personally – not much. Many of the folks in the organization do because they're on projects all the time, but I'm more of the stay-at-home kind of job. My travel is basically related to training or conferences, and an occasional site visit. I'll visit a client or a district or a project somewhere across the country, but it's pretty rare.

Lisa Mighetto: When you visit a client, are you trying to see how things are going?

Mike Roll: First it's to get some face time. It's always nice to put a face with a name. I may or may not have talked to them on the phone or shared email with them. But I like to see the results of the work we're doing. If you don't go out and look at these things, you don't know what they're talking about when they're in the office, necessarily.

But the key thing for me is to, as you said, find out how we're doing, and that's usually the question that I will ask, or that Brent will ask – how are we doing, trying to get feedback from the client as to how well we're servicing their needs. And we're very lucky, fortunately they're honest. We get some good things; we get some things that they'd like to see a little better. And those are the things that we take back and share with the organization.

Lisa Mighetto: What do you like best about your job?

Mike Roll: I think what I like best is – it's hard to pick one thing. We've got great people that we work with. I really enjoy the people. They're energized, they're dynamic, and they enjoy what they do. And, so, we have an enjoyable work environment.

I think deep down this particular job gives me the opportunity to fulfill a lot of my reasons why I went into the profession I did, and why I work for the organization that I

do. And for me, that's to make a contribution or to make a difference. And Hydroelectric Design Center, the work that it does makes an economic difference, a social difference, an environmental -

Lisa Mighetto: Is this a . . . or social difference?

Mike Roll: Let me finish the thought. We make an economic, social, and environmental difference for impact at a local, regional, national, and international level every single day. Now I'll talk about each one of those.

Economic difference - the work that we do produces electrical energy. Our job is to help these plants continue to produce electrical energy at the maximum possible output. That clearly is an economic impact to a region, especially when you see that the Corps of Engineers generates about 25 percent of the electrical energy in the United States. It's a pretty big chunk of the pie. And so if we're doing our job well, our units are operating efficiently, they're operating extensively, and that's a significant economic impact.

An environmental impact is related to things like improving the passage of fish through the units, decreasing mortality rates, finding less intrusive ways of lubricating these large mechanical structures, whether it's oils or lubricants or other things like that, whether they can be removed and greaseless products can be replaced, things that reduce the impact on the

environment, things that utilize less water to generate more power, which allows more water to be used for something else, for example. Those make an environmental impact.

Socially, if you're improving a region's economic status and making them a greener area through improved environmental impact, you've improved the social surrounding of the area. People enjoy coming to the project, they like the benefit of what the project does for them, and it makes a difference in the social basis. And then I said local, regional, national, and international because we work in all those environments.

We're obviously very local, right here in Portland, we're regional in the Northwest and across other parts of the country that takes us nationally. And then we have worldwide knowledge experts, and do a number of things on the international stage.

Lisa Mighetto: What do you think is the biggest challenge that HDC will face, say, in the next five years?

Mike Roll: The next five years, the challenge we will face is the results of the things we're doing right now to face the challenges that were presented over the last five years.

We're working toward some organizational adjustments. We're looking at reorganizing the way we're structured from our regional focus, full-service branches, to a national focus, with a product development oversight

group, and functional pools of engineers to draw the resources from to do the work.

We're doing that for a couple of reasons. Our key requirement, our key mission is to maintain the expertise within the Corps of Engineers for hydropower design, and we want to do the best job we can at serving our customers. And, as a result of the reorganization of a few years ago experiencing potential erosion of our expertise base, and we've made strong strides towards the interaction with our customers at different levels. But the customer environment is changing, and we want to make sure that we provide the best possible service, so we're looking at refocusing the way we're providing customer service right now.

So, the challenges we will face will be have we made an impact on maintaining the expertise, a positive impact, and are our customers feeling like they're better served. And five years from now we'll probably do it all again.

Lisa Mighetto: But it sounds like you're optimistic.

Mike Roll: I am very optimistic. This organization has made one cultural change already. It's dynamic, it recognizes where it needs to improve, and it's willing to take on the risk of doing that. I can't say that for all organizations, but this one seems to be willing to do that.

Lisa Mighetto: This morning after you left, Bud and Curt talked a lot about the culture

of HDC, HEDB before that, and how close knit it was. I just wonder with these four generations you're talking about if all the different groups of people, if you think that - has it continued to be close knit?

Mike Roll: I think HDC is - I suspect it's not as close knit as it used to be, but I could say that about any component of the Corps of Engineers that I've been in. And having been here 30 years, I can recall some fairly close-knit things, work related as well as non-work related. I can recall softball teams and bowling teams and golf teams being pretty extensive during my lifetime with the Corps. They're still around to an extent, but they're not as extensive. On the other hand, there aren't as many people as there used to be, either. We're smaller as an organization.

Within HDC, I think there are some very strong cultural connections. For example, there's the expertise connection and the work connection that brings people of different disciplines together regularly, but also within HDC there seems to be a camaraderie that exists in a lot of areas. One of our particular staff members has taken it upon himself to occasionally provide a pancake breakfast. So, he comes in, we set up a grill -

Lisa Mighetto: Right here?

Mike Roll: Right here in the building and for a couple of hours in the morning he makes pancakes. Well, that's how it started out. Then it's pancakes and waffles; then its pancakes,

waffles and scrambled eggs and bacon and sausage. Pretty soon it's probably going to be a whole buffet.

So, there's just a little thing that somebody does that draws the organization together.

HDC University feeds that cultural connection. Hawaiian Shirt Day - there are some really ugly Hawaiian shirts around. It's not ugly Hawaiian Shirt Day; it's just Hawaiian Shirt Day.

There's a non-work-related function, one significant one that HDC does called the NPLA, referred to by acronym because the acronym stands for National Power Lounging Association, basically a reason to go camping for a weekend. And this has a tremendous draw. They get 50, 60, 70 people total, which includes family and friends, and retirees. There's a big camaraderie activity that goes on there.

There's a number of folks in the organization that play golf. Little things like that are all scattered around the culture of the organization.

The key thing that we've been working on from the leadership side of things is to establish a clear understanding of where we think we're trying to go. That's the vision concept. Being "leaders in hydropower engineering," and getting the culture to recognize the things we do, things we talk about, things we choose not to do are all relevant toward whether or not we're making progress towards that goal. That permeates the culture also, and becomes a

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It is worth mentioning here that some of the extensive rehab projects require ten years to complete because you can't take all the generators in a powerhouse offline at once for major refurbishment – you have to do them one at a time to minimize power disruption.

method of cohering – is that a word? – cohering together the people in the organization.

Lisa Mighetto: This morning you mentioned an off-site meeting. Did that involve everybody?

Mike Roll: No, it didn't. The off-site meeting was in May 2002. It was our attempt to sort out what are we as an organization, where are we going, and how do we want to get there. And it culminated in the establishment of the vision of "leaders in hydropower engineering," and the setting forth of a five-year strategic plan. We called it HDC 2007. It was facilitated. It included about a third of the organization, which at the time was around 30 people.

The interesting thing about it is that it was different than any other off-site [meeting] I have been to within the Corps of Engineers because it included people from the organization from top to bottom. Yes, the managers were there. Yes, the senior people, technical people were there. But also we had people there representing all echelons of the organization. We had some of our newest people there, we had clerical staff there, and we had budgetary support staff there, a broad mix of the organization, a good cross-section of the organization. They came together for two-and-a-half days. It was a facilitated program. The facilitator laid out this challenge in front of us: think of your primary industry magazine or published journal, and imagine they're going to do an article on

you five years from now. What's the headline? And that's what we went into the off-site with. Where are we going, how are we going to get there, what's the headline? The headline came out, "HDC, Leaders in Hydropower Engineering," because that's what we want to be thought of.

We already knew we were players, but we wanted to be recognized as leaders. And when people think of hydropower engineering, we want them to think first of HDC. And, of course, we would like for them to think positively. That would be a good thing, and that's what we've been working toward for the last two-and-a-half years at this point.

Lisa Mighetto: Well, Bud remarked that he couldn't imagine something like that, like in the fifties or early sixties.

Mike Roll: An interesting comment and not unexpected. The fifties, sixties, this has been my perspective – fifties, sixties, and into the seventies for the most part, the Corps of Engineers – well, I can only speak for the Corps of Engineers – but my observation of the Corps of Engineers is that it was very regimented, very established along the military lines, very male dominated, and most, if not all of the employees in key positions and working their way up through the organization at that time, had some level of military background. And since we're a military overseen organization, if something needed to be done, you followed military protocol.

Seventies, eighties, nineties, and now into the 00s, we have different people that work for our organization. Many of them don't have a military background. They're of different genders than they used to be by substantial percentages. As a result, there's a different stimulus within the culture.

The behavior patterns, the beliefs of the fifties and the sixties have transitioned out of the organization. People have different stimuli now because they have different ways of thinking. And, as a result, for an organization to be effective and efficient, you need to have leadership that's willing to, and can clearly identify and exhibit what's needed to get to wherever it is you want to be, whatever it is you want to do.

Curt talked about the likelihood of HDC possibly having disappeared if they hadn't reorganized into customer focused entities. I think that was an accurate assessment. You don't like to see an organization of significant expertise disappear. But I think he's accurate. I think he's very accurate that if we had not metamorphosed our thinking and our cultural alignment, we would have had an extreme difficulty maintaining our expertise because client districts would have said; we can get that service somewhere else. We'll just take care of it.

Yes, no - maybe they can, maybe they can't. We have to go through that regularly. The world changes too fast now. Information comes at you too fast now - so

fast you can't keep up with it. And as a result, an organization has to be willing to take the risk to change. If it doesn't, it probably takes a greater risk that it's going to perish.

Lisa Mighetto: And you think HDC is adaptable.

Mike Roll: I'm certain HDC is adaptable. I've seen it -- HDC, from the time that Bud, and even up through Curt were here, was pretty much a home grown organization. You came into the organization, you stayed in the organization, you came up through the organization, and you went out, and that fifties, sixties mindset culture of stay with a company, loyalty, that sort of thing. That particular mindset isn't exactly in that way anymore. We don't have that cultural approach to things. And as a result, yes, there is a lot of adaptability that comes with that.

Lisa Mighetto: Is there anything you'd like to add?

Mike Roll: I'm pretty talked out, Lisa.

Lisa Mighetto: Well, thank you very much.

Mike Roll: You bet.

Lisa Mighetto: Mike left - Curt will continue.

Curtis Faulconer: As a result of that study we did where we could see all the work out there -- which we believed at the time to be around \$100 million in work but later turned out to be more than double that -- it

dawned on us that there was just no existing program to deal with all this work. Many of the Corps' hydro projects are really old, and we could see that a lot of the hydroelectric units at these projects were going to break down in a few years, I mean to the point where they just would quit running and not produce power. We realized that if the Corps didn't start dealing with its aging hydroelectric infrastructure in a systematic broad approach, they would soon be in serious trouble. It is worth mentioning here that some of the extensive rehab projects require ten years to complete because you can't take all the generators in a powerhouse offline at once for major refurbishment - you have to do them one at a time to minimize power disruption.

There was an evolutionary process where it became apparent to HQ, HDC, and our customer districts that the projected work was too great to fund from normal Operations and Maintenance funding. But Congress, because the whole country was short of money, would be unlikely to fund those projects that hadn't broken down yet unless there was excellent economic studies to show cost of benefit ratios, and to show what would happen if you didn't fix these things and, you know, lay the whole thing out into a big program. Subsequently Headquarters and a lot of the Districts and HDC were intimately involved in the development of processes which could provide good studies, comprehensive studies that could show the need to do some of

these major rehab projects. Each major rehab project could be \$20 million to \$50 or \$60 million for a pretty good-sized job.

Ultimately, HDC became the experts in how to assess the condition of various equipment and do some statistical predictions of when it was likely to fail, and the economics of fixing it versus not fixing it. And at the same time you're doing a major rehab to a turbine generator, figuring out some ways to actually get a more efficient turbine in there that could produce more power in the long run. Ultimately a lot of districts did major rehab studies on powerhouses, and they were very glad to have HDC a part of their team, and that's what we became. We became part of the district design teams for this specialized work – we would guide them through the process of setting up the economic studies, and the technical aspects of those studies, and that was a good thing in the long run. It helped the Corps maintain power without having unforeseen interruptions and it helped the districts get programs that they wouldn't have had without that organized process. It was a good thing, and it was really the substance of HDC's work through the mid-nineties and up until I left.

The only other major thing I want to probably talk about is the move from a division to a district?

Lisa Mighetto: A little bit, but go ahead. Let's get your perspective on it.

Bud Ossey: I am interested in that, too.

Curtis Faulconer: Over the years, there was a constant effort by various districts for HQ to not have a hydro design center. This was driven by a shortage of funding in districts all over the Corps -- and they didn't like having to send money to a center when they were having trouble funding their own staffs. And then within the Portland area here, Portland District always said that divisions are supposed to provide oversight and funding and those kinds of things, and the actual work is supposed to be done within the districts, so there is no reason that the HDC shouldn't be in our district rather than the division office.

HDC always felt that if we went to a district and got put into a district structure, that eventually senior district management or a District Commander would wonder why there are two separate engineering organizations within the district, and merge them together. Once that happened, we knew it would be the beginning of the end. We felt that the district priorities would supersede the priorities of other districts, and we wouldn't be able to give equal effort to getting their work done if we were short of resources.

Eventually HQUSACE, our Washington, D.C., headquarters, decided that under current Corps philosophy a technical organization such as HDC should be attached to a district, but they embraced the concept that if they just put us in the district with

no guidance we probably would have trouble remaining viable. So, they invited us to work with them and the management of other Corps Divisions to come up with a new Hydroelectric Design Center regulation. It established what work is center mission, the process for planning center work, funding methods, and reporting channels.

I think this regulation is unique in the Corps – it requires the HDC to report on non-project specific technical matters directly to headquarters in Washington, D.C. On project-specific work for a district, we report to the District Commander and staff. And on day-to-day HDC management and oversight matters, we report to the Portland District Commander. As complicated as that sounds, it worked smoothly and it seems to be well accepted by all the players. It has really clarified roles and responsibilities, and made workload planning for customers and HDC alike more predictable and stable, and it eliminated a lot of infighting about whether that work is major enough to go to HDC or not. A good piece of work.

Anyway, as part of that, we were attached to the Portland District. Before the physical move, I had several meetings with district support staff, and honestly I started to feel like HDC was a holiday turkey sitting on the table, and the district managers had carving knives. I think some initially viewed HDC as a cash cow because we had a lot of work and parts of the district sometimes were struggling for work, and also

we had a big pool of warm bodies. The more people you can get in the district, the stronger the district is, so they saw this as a good thing. That is how I felt at first, but the District Commander made it easy for me to discuss HDC's concerns about maintaining a nationwide customer focus and retaining expertise. He was very gracious, and the transition couldn't have been any smoother. He brought us in directly under him as part of the district's senior management team, and kept the director of the center at the same grade as the senior district managers. So, I was involved in all the major decisions within the district, and the district treated our organization with respect. The district has been very supportive of HDC and its unique mission, so the transition from division to district went well.

Lisa Mighetto: And who was the District Commander then?

Curtis Faulconer: Well, there was a transition at the time. When we started discussions the Commander was Colonel Tim Wood, and his Deputy Major Chris Cottrell. Both were great guys who really made the transition work. And then after that was Colonel Slusser, and he was equally supportive. And the subsequent commanders have also been great.

This would be a good place to say a little more about Major Cottrell. He basically could see that we were struggling not to come here originally, and he finally took me aside and said, "Curt, what are you afraid of with

this move?" We discussed HDC's concerns about maintaining expertise and customer focus once rolled into the district structure. He said "Okay, we'll fix those things so they won't be a problem," and he did. He was a quick study, and everything went very smooth after that.

Well, that's probably enough on that. I guess I've covered the major topics that I wanted to mention.

Lisa Mighetto: Well, if you're both willing, I'd like to talk a little bit about develop... culture which is something we talked about briefly with Bud, sort of following up on something Mike had said. Did he call it off-site? Did he say who was involved in that, do you know?

Curtis Faulconer: Well, I don't know about the one he's talking about, but we did one – we did a number of activities similar to that at the time we were thinking about our major internal reorganization where we changed from a discipline based organization to customer-focused regional base. We knew this was going to be an internal struggle – I mean, you have a culture here that's existed since 1946 or 1947, and there's just bound to be a lot of resistance to any major change like that.

So, we realized that not only did we need input from all the folks that are part of the organization, and our customers, too, but we also knew that by then being totally involved in the process, we could get some

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Also, over the years, we began to, with conscious effort, focus on doing more social events to make the group feel more like a team... right now in HDC, a big group of people goes camping every year. They also have some golf things they do, and they do their Christmas potlucks and all that stuff, and Hawaiian Shirt Day.

ownership so that it wouldn't fail through people internally trying to torpedo it.

Lisa Mighetto: Bud, during your time here, did HEDB meet like that with employees to get employed, or is that kind of a new development?

Bud Ossey: No. HEDB, at the time I was there, was strictly HEDB, and we just were there to function as a design entity to design powerhouses. And we were not doing any interrelationship with the districts, other than to coordinate, as I mentioned, the design of the powerhouse as it relates to the dams and the navigation lock.

Lisa Mighetto: So, there were no all-employee meetings to develop a division for HEDB.

Bud Ossey: No. It was all set up. It was all organizationally identified, and there was the division, and in the division you had the HEDB, and in HEDB we had the chief of HEDB, and then we had the chief of the civil engineers, and the electrical and the mechanical. And then Chet Scott was in charge of the hydraulics, the turbines, and that was it. And within that concept as, for instance, in our civil engineering, or the structural, we have little subdivisions of when working on the different projects, and we had at one time several projects going.

Lisa Mighetto: Would it be correct to say, then, that – you're talking about the structure was very different from what it is by the time Mike gives, but

would it be correct to say that the culture is also different. It seems like Mike was talking about getting employees' input. Is that correct, and you, Curt, mentioned getting ownership, that is, getting everybody's opinion and forming this vision so that you can all move ahead together as opposed to sort of having it come from somewhere else. Is that correct?

Bud Ossey: In our early days, all opinions and direction came from the top. There was no employee relationship other than the fact that occasionally you would have a suggestion put in the suggestion box. They had a suggestion box. As I mentioned earlier, my suggestion of eliminating the generator floors was shot down because they didn't want anyone then, and as Curt mentioned, ideas like that are hard to accept from old-time habits.

Curtis Faulconer: I guess it's always been pretty clear to me that the world changed about the time I got out of college. Really, management across the U.S. in all phases of industry and government was changing. Top-down management – where the top made all the decisions, that was beginning to not work back then, and also it wasn't too many years after that that you started hearing words like "flattening" organizations by eliminating levels of supervision and management. And I mentioned earlier about how the Corps was changing its supervisory ratio so that instead of having like . . . four to six employees, you had to have at least ten employees

for each supervisor, and that included managers, too. So, if you took HDC, you'd have the Director, and you had a Deputy, there are two people, and then you had the three branch chiefs, there are five people. So, right there for those 5 supervisory managers, you must have 50 non-supervisory staff. That doesn't leave room for any Section Chiefs.

So, at the time we reorganized, we also eliminated all of the Section Chiefs. We eliminated, I think, six or seven supervisors. What I found interesting out of that was, first of all, nobody complained. The supervisors were glad to not do that anymore because it was almost all budget and personnel work filling out performance reviews, and engineers hate that stuff. The former Section Chiefs got back to being technical experts, which they loved.

So, now, I had three Branch Chiefs supervising 80 people total, having to do all those performance appraisals on their own. So, we said they could set up team leaders if they wanted to help them with some of that staff. But most of them figured out ways to do the service themselves. And having a flatter organization really in many ways was a very smart thing. I mean, I could see it in industry how it gets a lot faster communication from the top and the bottom and vice-versa. It just makes communication throughout the organization better and more effective.

Anyway, we embraced that flattening concept, and we just

went ahead and did it when we reorganized. We saw a lot of our customer districts struggling with implementing these supervisory ratio changes. They were not meeting the deadlines to cut down their supervisory ratios, and we were already there, and although I thought it would be a big issue, but turned out a non-issue. It just worked, and the employees don't seem to mind it. Most like working directly for the head guy for all of the customers in their customer districts. It worked real well. I was surprised.

But even after being retired five years, I still feel sorry for the three branch chiefs who have to do up to 20 or 25 performance appraisals four times a year, you know?

Lisa Mighetto: So, these are quarterly then.

Curtis Faulconer: Well, they're supposed to be quarterly interviews and feedback sessions, and then an annual – I guess it's probably still the same.

Lisa Mighetto: A lot of paperwork.

Curtis Faulconer: A lot of paperwork.

Bud Ossey: Yes. We didn't have that at all. This, to me, it's like we did all of our design work with a slide rule, and it's just like the changeover from a slide rule to the computer. It's a whole new generation. A whole new generation of engineering, a whole new concept of management, a whole new concept of organization, and this

is strange to me. I'm learning a lot today.

Lisa Mighetto: Well, Curt, you must have witnessed the change from slide rules to computers.

Curtis Faulconer: Yeah, I had my slide rule when I got out of Oregon State University, and calculators were just beginning to come out -- \$400 for a calculator. And I guess one thing I would say is we in HDC were always fairly progressive about moving to computers. We could see that that was the way the industry was going to go, and we just stayed right there on the leading edge. We moved ahead as fast as we could to get everybody computers, and get them using them productively.

Lisa Mighetto: Did you have computer training for people?

Curtis Faulconer: Oh, yes, but, I mean, it was a process – we knew it would take years, and it did take years. But we were progressive. We always put a reasonable amount of funding toward technology, and we budgeted for that so that we wouldn't get caught short. We knew machines wouldn't last more than five years before becoming obsolete, and we knew that we had to keep the power users, such as the people that were doing computer aided drafting and design, the most powerful machines. And so we set up ahead of time to bump their machines down to other people after a year or so and get them new machines. We explained it all to everybody so

people, even if they didn't like getting a used machine, at least understood the fact that we were money limited and that we had to make best use of the equipment and try to get everybody a machine that could do the jobs they had for them.

As early as anybody in the Corps, everybody had machines and were using them to do the specifications, and the spreadsheets for economics, and all those kind of things. Pretty good there.

Lisa Mighetto: Well, Curt, I promised Stefanie I would ask you about Hawaiian Shirt Day.

Curtis Faulconer: Well, you know, HDC –

Lisa Mighetto: And nobody is wearing a Hawaiian shirt.

Curtis Faulconer: You know, HDC went through a lot of stress for a lot of years. As it moved to the district, it had to be hard on people. People had to make new carpool plans, find different parking arrangements, you know, leave a building that they were used to, and of course, HDC went through a lot of those in the past, but couple that with a major organizational change internally and then a major organizational change from a new boss. We're now working directly for a military person instead of a civilian in the division, and of course, that took a lot more of my time because every three or four years you get a new Commander, and it's an educational process. Anyway, we realized we needed to do a few things that were a

little more fun and less stodgy, and I guess to make what should have been a short answer short, we just decided to do a few things to help kick up morale.

Also, over the years, we began to, with conscious effort, focus on doing more social events to make the group feel more like a team, and right now in HDC, a big group of people goes camping every year. They also have some golf things they do, and they do their Christmas potlucks and all that stuff, and Hawaiian Shirt Day.

Lisa Mighetto: And that's every Friday, Hawaiian Shirt Day?

Curtis Faulconer: Yes.

Lisa Mighetto: And I did see people wearing Hawaiian shirts.

Curtis Faulconer: I just forgot. I've been retired five years.

Bud Ossey: That's neat. We never had that sort of an internal relationship. We were always too busy.

Curtis Faulconer: When we went into this reorganization where we took the branch chiefs and made them responsible for interdisciplinary groups, it resulted in a situation where various disciplines were sitting together that previously didn't have much interaction. People that previously had little camaraderie, but also frequently had somewhat of a competitiveness between them were now sitting together part of the same team.

We knew it would change a lot of the dynamics of the relationship. Now you see mechanical and electrical engineers going to coffee together, going on social outings together. I think it's a great thing, and it cut down all that stuff about, you know, "I'm electrical and you don't know my business, and so stay out of my decision." Now they talk things out because it's all customer focused.

Bud Ossey: There was a little bit of arrogance between the different disciplines. The electrical engineers thought they were a little better. No, with all due respect –

Lisa Mighetto: Why was that?

Bud Ossey: This was a hydroelectric design project, doing electrical work and they felt that their involvement was a lot more important than anybody else's. This wasn't any crisis or anything, and I don't mean to infer that there was any personal animosities or anything, but it was just sort of a tone you could feel that they had the impression that they were more important. And that's, of course, since changed because Glenn Meloy and Bob Krahn and I are extremely close friends, and we meet every two months. We have an old-timers group – the Corps of Engineers old-timers, we meet, get together, and it is kind of a social aspect.

The only social aspect we had was between individuals who had made friends, and they in turn would get together. We had

what we called a square-dance club in HEDB. It was started, and it evolved out and encompassed other people, but it started in HEDB, and Chet Held, who was one of our engineers, was a caller – a square-dance caller, and the Castle-Eighters is what we were called, a square-dance club called the Castle-Eighters, and I was the first president of the Castle-Eighters (we were named from the Corps Castle). There were eight people in a square, and we were called the Castle-Eighters, and we would meet once a week and square dance, and that was our social aspect. The Division Engineer would come and watch General Itchner and his wife, Mrs. Itchner, would come and sit there and watch us, and some of the staff would come and mingle, and that was the big social gathering we had was square dancing. Then a few of us would get personally involved in social activities and go to each other's houses or something. But other than that, there was none.

Later on, a lady by the name of Effie Godman "Grand Dame" and Delores Miller, and even Mary Johnson from the personnel office sort of started groups of employees who would have parties, softball teams, bowling leagues, and picnics. I think the bowlers are still going strong.

Many of the retirees still bowl on the Corps league. Not sure about the softball teams. I know for years that there was a trophy that made the rounds.

Lisa Mighetto: How about a Christmas or holiday party?

Bud Ossey: Oh, the whole district would have a Christmas party. Christmas parties – the division and districts, and that was a fun time when we would go and intermingle with the districts. We were division and we were a little bit arrogant, too. But, being division, we were a little above the district. But we had good relationships with a lot of people. It was fun.

Curtis Faulconer: Talking about the social aspects within HDC reminds me I should talk about work relationships with people outside the Corps. Earlier I mentioned that Jim Norlin who was one of our Branch Chiefs, was an out-of-the-box thinker. We started talking about things we could do to increase our interaction with our customers and help them do their business better, and then we started thinking funding streams related to Corps hydropower. Federal power marketing agencies like Bonneville Power Administration, and Southwestern Power Administration market all power from Corps projects, so we started working closer with them saying, "Ultimately you're the ones that sell the power that the Corps produces -- what kind of things can we help you and your Districts?"

We got involved early on with direct funding for the Bonneville Power Administration. Congress gave BPA authority to fund the Corps directly, and of course, once that happened, we knew they would want more control of the work, and we said that's a good thing because we can help with that. A lot of people

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...we were very much concerned about the seismic and atomic bomb events that could conceivably develop. And so they sent me down to Port Hueneme, the naval base.

...in California, to the Atomic Defense Engineering Course that was put on by the Navy, and I spent two weeks there of the most intense study and training that I ever spent in all my time in college, even preparing final exams.

were resisting that idea of direct funding because they thought the Corps would lose control, but I think we realized that it would actually bring work in that we wouldn't get otherwise.

And it seemed logical to me that the person that's having to market the power should have a say in the kind of things that would help them make sure that our powerhouses are going to be reliable, and can accommodate system control things and stuff that they need.

And we also consciously started increasing our coordination with headquarters, educating new folks at headquarters as they came in, anybody that had something to do with hydropower, making quite a few trips a year back there to different people to talk with them about things like economic studies we could help with, getting their ideas on how you do economic studies, how we could involve the districts more in the economics, how we could develop teams, and with the power marketing agencies, you know, just meeting with them periodically, talking about what they envisioned for the future of their system and things we could do. If the HDC is going to serve the Corps, it has to do those kinds of things. It can actually help the Corps work with its customers and associates better. It's neat stuff.

We made a lot of good friends out of that also, people at headquarters and other places around the country, people that

were kept touch with socially. So, that was all good.

Lisa Mighetto: What do you miss the most about your job?

Curtis Faulconer: Well, I miss all the people. It was a lot of fun. There was a feeling of accomplishment in seeing us successfully get work done, and seeing us satisfy customers, those were always good things, and I miss a lot of that. I don't miss a lot of the paperwork.

The Corps, just a few years before I left, did a major change of budget systems, and all the managers had to do all the stuff that they had support staff doing before – the system is called CEFMS. And we all had to have a smart card that when we'd get on the computer, we put the card into a slot and we would have to financial detail of every transaction, and it was hours and hours and hours a week of stuff that really was no fun. I'm not negative on the system, but I have to say I was glad to turn in my CEFMS card when I retired.

Lisa Mighetto: You just don't miss it.

Curtis Faulconer: I don't miss it!

Bud Ossey: I can relate on things about Curt missing. It doesn't apply to me right now, but it did in the past. When we came in today, we met right at the security desk, by coincidence, and so we came up in the elevator into the office together. In spite of the fact that Curt got lost, even doing that, he continually was bumping into people, and

it took us about over 10 minutes to get from the elevator to here because he met so many people that stopped him and talked to him, and you could see the real fondness and good relationship that he had when he was here because he would talk and say hello to people by first name all the way through, and he knew everybody. And people would come out of their way to come up and say hello to him. And that's a gratifying feeling, something that you look back on when you leave an organization, and just really cherish. And up until a few years ago – it's been over 31 years that I retired, and I'd say maybe one or two people might still be here. That was a feeling I had in coming back once in a while into the office and walking in, and having a fond greeting, a friendly greeting, a sincere social greeting. It makes a person feel good to know that they're remembered, and that was beautiful to walk in here with Curt and watch and see that. It just took me back years, and then you feel good to see it happen with him.

Curtis Faulconer: I'm amazed, Bud, about all the activity you've kept up since your retirement. I didn't realize you had been retired that long because I always saw you at SAME and different professional functions, and heard your name a lot.

Bud Ossey: It's been 31 years since I retired and I still have a fondness for my having been involved with the Corps of Engineers. As you said, I am very active with different entities since I retired, and that's what has kept me going. I still maintain my

relationship with SAME. I was the national director for seven years for SAME, and as such I was involved in all their national meetings.

And I was the one that brought the first national conference to the West Coast that they ever had. I went back to a national meeting in Washington and made a pitch to bring the conference to the West Coast. They said no, we always have it in Washington. And I said, you know, you have a lot of people that come here from the West Coast to attend your meeting, myself included. And surprising, it's the same distance from Portland to Washington as it is from Washington to Portland. And then I made quite a pitch about the salmon feeds, and the fishing, and the things that they could see that they have never seen. I told them we don't have Indians out there running around on the street to scalp them, so it's safe. And they took a vote and they decided to come out here. That's a sideline from Corps of Engineers.

Curtis Faulconer: Bud mentioned being proud. One of the things I feel really good about in my life is my involvement with the Corps, and especially with hydropower. I said earlier that I've always felt that it's environmentally a desirable kind of power generation compared to the alternatives. It's clean. I mean, we have some problems with it, but I don't believe nearly as many problems as the fossil fuel plants or nuclear plants. I believe hydropower is a good thing for the nation.

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I told them we don't have Indians out there running around on the street to scalp them, so it's safe. And they took a vote and they decided to come out here.

Even though we didn't have the big powerhouse to build in the later part of my career, I got a lot of satisfaction from the programs we initiated to systematically refurbish the Corps' aging hydropower infrastructure so it will continue to generate power for the next 50 years – I think that is pretty good stuff.

Lisa Mighetto: Do either of you have anything to add?

Bud Ossey: No.

Curtis Faulconer: It was a lot of fun.

Bud Ossey: It was very interesting. To me it's been interesting, in that I've learned so much about how HEDB has changed and modernized itself from the time that we started with the horse and buggy days, you might say, to the Lexus and Cadillac days that we have now, and it sounds so exciting and it's way above my head what we had to go through when I was involved. And I'm just so proud of what they've done in the way of progression.

Curtis Faulconer: You know Bud, what you said brought something to mind. Throughout my career there was always a new management philosophy developed every few years that the Corps would embrace, and we would send everybody off to school for total quality management or some other new thinking, and usually it was stated that you needed to improve. That always implied that you had not done good

enough in the past. But I never felt that way – I feel the Corps has always done a great job, exactly what it needed to do at the time to serve the requirements it had. But things change, and so has the organization.

Lisa Mighetto: And it just evolved.

Curtis Faulconer: It evolved. The changes we've made haven't been because we were doing something wrong for a long time. It was because we could see that the world was changing, and we needed to change with it.

Bud Ossey: One thing I did forget to mention is in 1960 there was quite a scare about the potential of atomic bombs on the West Coast, and everyone was building bomb shelters in their homes at that time.

Lisa Mighetto: I remember that.

Bud Ossey: And on the side of the powerhouses, we were very much concerned about the seismic and atomic bomb events that could conceivably develop. And so they sent me down to Port Hueneme, the naval base.

Lisa Mighetto: In California?

Bud Ossey: ... in California, to the Atomic Defense Engineering Course that was put on by the Navy, and I spent two weeks there of the most intense study and training that I ever spent in all my time in college, even preparing final exams. We got there the first day on a Sunday. I had my wife and two

kids with me, and I went in and registered, and the first thing they did was they handed me a whole stack of books and an assignment for Monday morning, and I said, "Well, I have my wife and kids here, what do I do with them and where can I put them?" They said, "I would suggest you send your wife someplace and tell her to come back in two weeks." And that's what I did. I never saw her for the two weeks. She went visiting her relatives. That was the most intense course of study I have ever gone through, and I hadn't done any calculus or any of that engineering work, and I had to do all of that. And you were graded, and you had to pass. Fortunately, I passed. I think I got a 3.6 or something, and you were graded on it.

Lisa Mighetto: What was the upshot of that? Then you then come back and –

Bud Ossey: When I came back and I introduced some of the things I learned about design to take care of extreme seismic forces and incorporated that into the design of the powerhouse. As it was in our design, we were still overly designed in all of our design from the standpoint of earthquake and out-forces, and were probably 100 percent over design. But, even with that, we amplified it even more after I got back from that seismic study. That defense-engineering course that I took was the most concentrated and intense course of study I ever had in my life.

Curtis Faulconer: Maybe just a short session here – you mentioned safety, and that's an

important thing. I remember numerous times that money pressures and maintenance problems would cause a district to want to eliminate some system or piece of equipment critically related to the safety of the powerhouse and personnel. These issues normally resulted from a district that no longer had institutional memory of the original reason the system or equipment was necessary, and had lost the specialty expertise needed to make an informed analysis. So, that's one place where I know HDC really added some value. They worked with the districts and headquarters when a safety issue like that was being considered, and helped the players through a systematic process to make a prudent decision. Those were good processes where HDC was able to supplement a district's institutional memory and expertise.

Bud Ossey: Yes. Well, thank you very much.

Lisa Mighetto: Thank you both. It was interesting.

Bud Ossey: Like I said, I learned a lot.

Curtis Faulconer: Me, too, actually Bud. I haven't talked to anyone that was here when HDC was first formed. I thought it was about 1947, but we didn't have anything definitive. I didn't realize you had worked there. That's really great to know that. I'm glad that you were here at this interview at the same time I was.

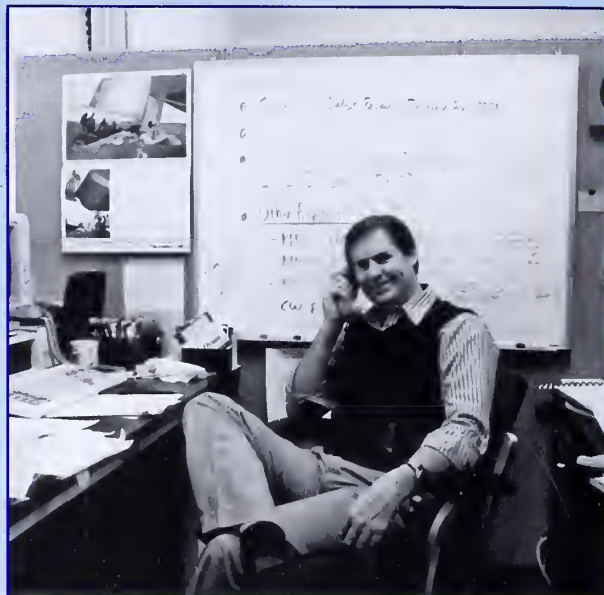
Bud Ossey: I was the first one hired.

Curtis Faulconer: That's really neat.

Lisa Mighetto: Well, thank you.



1950/60s Christmas Party.



Curt Faulconer at his desk.



The 1950s Gang



HYDRO ELECTRIC DESIGN CENTER

INTERVIEW 15

Interviewee: Brent Mahan

By Lisa Mighetto

May 3, 2005

Telephone Interview

Lisa Mighetto: I suggest that we begin with you describing a little about your background. That is, where did you get your education, and when did you start working for the Corps of Engineers?

Brent Mahan: I received my undergraduate degree at Boise State University. I have a degree in General Business and Economics. Then, in the mid 1990s, I received a Master's degree in Resource Economics from Oregon State University. I started my career with the Corps as an economist in October of 1982 at the Alaska District and was there until 1992, although in the late 1980s and early 1990s I spend nearly a year at the New York district as the Chief of Economics.

When I left Alaska, I moved to what was then the North Pacific Division, which is somewhat equivalent to . . . what's currently the Northwestern Division, although the boundaries are somewhat different. Basically, the regional or division headquarters.

I went there as an economist and continued on in the water resources planning arena although I was not a first-line manager at that point; it was more of a program manager and a reviewer position, that sort of thing.

After a couple of years, my position was being eliminated; that was when divisions were downsizing. And so that's how I came to HDC. I had the opportunity to come to the Portland District to work on the economic analysis for the channel improvement process for a project that is just now moving into construction or go to the Hydroelectric Design Center. I knew that the design center existed, didn't really know anything about it, but they needed somebody to manage a nationwide greenhouse gas reduction study.

I'd never really done project management but I thought that would be a good opportunity to broaden my experience. So I came to HDC the rest is history, as it were.

Lisa Mighetto: And when did you arrive at HDC?

Brent Mahan: It was around 1997, something like that.

Lisa Mighetto: Okay. So you've been there roughly eight years.

Brent Mahan: Yes.

Lisa Mighetto: And it sounds like you attended the university while you were working for the Corps.

Brent Mahan: Yes . . . it's really the Department of Army but it's a long-term training program – it's a competitive program and you apply for it, but they will pay for graduate-level study in a particular area. And so I applied for that program and I was accepted. They paid my tuition and everything to attend Oregon State.

Now, that wasn't specifically a Master's program, but with some additional course work on my part and a thesis. I was able to get a degree. So, yes, I did do that while I was working for the Corps.

Lisa Mighetto: Were you working full-time?

Brent Mahan: I was working full-time for part of the course work, but for much of it, I was actually in the residence in Corvallis.

Lisa Mighetto: Oh, so you were on a leave from the district?

Brent Mahan: Well, I was actually what they call "temporary duty." I was in travel status while I was there. So I still received my salary. It's a great program. I received my salary and I received travel and per diem to attend the Graduate Program.

Lisa Mighetto: And now you are the director of HDC, correct?

Brent Mahan: Yes.

Lisa Mighetto: What are your major responsibilities as director?

Brent Mahan: I am the lead person for the organization. So I would say "the buck stops with me" in terms of that organizational responsibility.

I would say that I have oversight responsibility for executing the organization's mission and having a long-term view for the organization and the organization's success, and making sure that we're doing the things to stay relevant and vital to the Corps of Engineers, the larger organization in which we belong, and that we're accomplishing our primary responsibilities as an organization.

Lisa Mighetto: And when did you say you became director? You arrived in 1997 but you didn't arrive as director, correct?

Brent Mahan: That's correct. So just to kind of run through that history real quick -- for a couple of years, I was a project manager here. And then HDC went through some reorganization that you probably talked to others about, when we went from the functional branches to more of an interdisciplinary regional structure.

And, as part of that, there were some reshuffling of the management positions and I competed for and was selected as the temporary deputy director of HDC, the position that Mike Roll is currently in.

Lisa Mighetto: Yes.

Brent Mahan: And I was in that, I don't remember how long, probably a year or so, a year plus.

And then I competed for and was selected for that position on a permanent basis. And that was in the late 1990s, I guess, or around 2000 or so; I'm not sure exactly, I don't remember the years. You can look at our site if you really need a date.

And then in February of 2001, I was selected as the director.

Lisa Mighetto: Okay.

Brent Mahan: February of 2001.

Lisa Mighetto: Okay.

Brent Mahan: And I've been in that position ever since, except I've done a couple of other assignments while in that position, one of which was about seven months as the deputy district engineer for the Portland District. And then about a little over a four-month assignment as the hydropower business line manager for the corps of engineers in Washington D.C.

Lisa Mighetto: And what was that like?

Brent Mahan: Well, what do you mean by that, what was it like?

Lisa Mighetto: What did you do in that capacity?

Brent Mahan: Well, the primary responsibility of that

position is to manage the Corps' hydropower program. It's a staff position at headquarters; it's a one-person position. But you have business line managers in each one of the divisions that have hydropower; I think there are five divisions that have hydropower. So they are sort of a vertical team that you lead in terms of carrying out the hydropower mission.

The position is typically also responsible for putting together the hydropower portion of the Corps' budget; that's not work that I did. I actually, when I was back there, ended up spending a lot of time working on strategic planning for the Corps of Engineers.

We have a new Chief of Engineers, General Strock. He took over last summer, it probably was, and I went back to headquarters in October. And so he had staff at headquarters and is working on laying out a strategic direction for the Corps for his tenure, really, and beyond, kind of setting that strategic direction. So I was involved in that, primarily in the infrastructure side.

While I was a business line manager, I actually ended up spending a very large portion of my time in strategic planning activities related to Corps infrastructure.

Lisa Mighetto: And you relocated to D.C.?

Brent Mahan: Yes, I was back there on a temporary assignment, correct.

Lisa Mighetto: And is that over now? I mean in terms of your participation?

Brent Mahan: Oh, the position is being recruited for a permanent basis and there is nobody in it right now. So while the job assignment is over, I am still carrying on some responsibilities associated with the position because there's nobody else to do it.

Lisa Mighetto: Now, General Strock was in the Northwestern Division, correct?

Brent Mahan: He was.

Lisa Mighetto: So did you know him, did you work with him when he was in Portland?

Brent Mahan: Yes, I did.

Lisa Mighetto: Okay.

Brent Mahan: And when I went back to headquarters – those positions are pretty hectic, so there's not a lot of face time with the chief relative to the position I was in. But he recognized me as soon as he saw me and we did chat a couple of times while I was back there.

Lisa Mighetto: Brent, you mentioned to me when I was in your office briefly last week that it was unusual for somebody with your background to be in your position as Director of HDC?

Brent Mahan: Yes.

Lisa Mighetto: And why is that?

Brent Mahan: Well, I would say until me, there was a long history of – and, you know, I'll talk specifically about HDC but I mean it's really true for the Corps as well, like for Chief of Engineering positions.

But there is a long history of folks in the position that I was in – that they had a technical background in HDC, so that they were hydropower design engineers. They knew the nuts and bolts of what the organization did. It's kind of growing up, you know, technically within the organization.

Lisa Mighetto: Yes.

Brent Mahan: And I have a broader kind of water resources background that included hydropower, but I don't have a specific background in hydropower engineering. You know, I'm not an engineer, for example.

And so that is a change for HDC but also it's indicative of a change that we're seeing in the Corps. And I would say that that change is going from thinking that the best background for senior leaders in the organization is that they have a technical background to one more of what we need to have is folks in the senior leadership positions that have the right leadership skills and talents and not necessarily the detailed background.

So, I have that broader-based background and bring more of those leadership skills, those organizational and people and

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-- yes, well, I guess I'll just leave with that leadership abilities rather than the technical abilities.

Lisa Mighetto: And it sounds like you think this is a development that affects the Portland District specifically and maybe the Corps generally?

Brent Mahan: Yes, I do. Well, as an example, historically, you would have had engineers in all of the major organizations within the Portland district. You know, like the chief of operations, the chief of engineering and maybe even the chief of programs and project management, although not necessarily there. But the only engineer in those senior level positions right now is the Chief of Engineering. And that's a big change from 20, 30 years ago; it's a very big change.

Lisa Mighetto: Are there other big changes that we should be sure to include in this history that you've seen in your eight years at HDC?

Brent Mahan: Well, I think that we have been transitioning as an organization. I mean you probably have a fair amount of information about our reorganization that we went through and how that's evolving into the future.

Lisa Mighetto: Yes, some people have talked about that.

Brent Mahan: Okay. So -- that's kind of a structural change, but that's certainly a major change, away you know, for HDC that we've seen.

But I would say the other change that others may have talked about is the shift from designing large new powerhouse projects, as the major multipurpose dams were being constructed in the Columbia and Snake River systems.

Our focus was designing and building new powerhouses in the Northwest. And then, as all of that work was completed and then HDC became the national center of expertise so that that responsibility for hydropower engineering and design was focused on HDC for the entire Corps of Engineers, and there were actually two other design centers that were decommissioned.

That shift in work because of just the maturity of the big construction projects being completed shifted more to recapitalization in repair and replacement engineering and existing powerhouses. So instead of new construction, but it was more modernizing the existing equipment because the plants were beginning to age.

So there was a shift to the projects because we were supporting -- we were providing engineering services to districts rather than having a primary responsibility for new construction engineering and design.

And so, I think, early on, we became more of a service organization. And I think in the early years, we struggled with that a little bit and we had an organizational attitude of, "We're

the technical experts and we'll tell you what you need in your powerhouses."

And it also resulted in some turf issues about what fell within the district's purview and what we saw as our responsibility, the regulation that we operate relative to being the Corps' hydropower engineer, and then what we believe – and some issues over what we believe is our responsibility relative to taking care of this hydropower asset for the Corps.

And it created some tensions between the people for whom we were providing services and us.

Lisa Mighetto: Was that tension there when you got there or had these issues already begun to be resolved?

Brent Mahan: That tension was very much here when I got here.

In a new way, in terms of the services we're providing for the districts, we go and listen to their problems and we talk to them and we help them figure out what the best technical solutions are for their problems rather than going in there and saying, "You know, we're the engineering experts in this area. You know, we'll tell you what you need."

And so, the way I like to think about it is that we're shifting to being more service-oriented and operating more like a business so that we're looked at as being value-added to the districts that we serve, rather than this

mandatory center that they have to use.

Lisa Mighetto: Well, this is a related question but I'm wondering how that transition occurred. That is, earlier when you described your responsibilities you mentioned that one of them is addressing the question, "How do you stay relevant?" So what are the ways that you do that? Do you visit the customers and to talk to them? Is it training? How do you stay relevant, how are you making that transition to being service-oriented?

Brent Mahan: Well, I would say that it's – there are a number of facets to it, all of which I won't deal with . . . But one is to embark about making a cultural change within the organization in terms of how we interact. And it just involves all aspects of trying to set up processes that facilitate that. For example, setting up processes that ensure that we're writing clear scopes of work and that we're sitting down and listening to the customer in terms of what issues there are, and then trying to translate that into a scope of work that we're both agreeing on what it is that needs to be done.

Lisa Mighetto: And is that a change from the past in that earlier the engineers might say, "This is what needs to be done, this is what you need"?

Brent Mahan: Yes, right.

Lisa Mighetto: Okay.

...so we go and listen to their problems and we talk to them and we help them figure out what the best technical solutions are for their problems rather than going in there and saying, "You know, we're the engineering experts in this area. You know, we'll tell you what you need." ... more like a business so that we're looked at as being value-added to the districts that we serve, rather than this mandatory center that they have to use.

So it's very much that I want HDC to be viewed as a leader – a leading organization within the Corps, that we're headed in the right direction, we're supporting the broader initiatives, and that the HDC leadership is really connected and engaged.

Brent Mahan: Or you might have a customer who asks us to do something and we describe it in a sentence that could be a fairly significant piece of work. I mean it might, it could be hundreds of thousands of dollars. It's just not clearly spelled out.

And what happens is when you do it that way is that we have an expectation of what we think we need to do and the district has an expectation of what they think we're going to do for them. Final outcome doesn't always line up and meet those initial expectations. So then you have problems at the end.

So it's much better to work it out at the beginning than it is to find out that we're not meeting their expectations at the end because then you've usually got problems.

So business process is the one part of it.

The other part of it is that we're 50 percent new employees since 1999, so we have a lot of new staff. It's just inculcating through organizational messaging and training about "this is how we do business around here," of thinking about who we are and how we should interact with our customers in a different way. So that's a long-term cultural change that takes place over time with new folks coming onboard.

And then I think also in terms of staying vital and relevant is just making sure – and this too is a bit of a change, I think, from the past. We were pretty separate and

we thought of ourselves as being very separate from the broader Corps of Engineers; you know, we're kind of unique.

And a philosophy that I've brought that I think is important is that we need to be connected to the larger organization. We need to understand where the Corps is going strategically, where the district is going strategically, and making sure that we are in alignment with that, and that we're doing things that support it, and that we have lines of communication to senior levels within the Corps, and that we're engaged with them.

And so that's some of the things that I've tried to do. And...

Lisa Mighetto: Do you think your background is relevant here – that is, you didn't really grow up, career-wise, in HDC...

Brent Mahan: Right.

Lisa Mighetto: ... the way some people did. You've been all over in other districts.

Brent Mahan: Yes.

Lisa Mighetto: So do you think that helps to give you a broader perspective?

Brent Mahan: Absolutely. And that's part of that change in terms of bringing that different kind of leadership background.

And so I'm on the Portland District Corporate Board. That's a group of senior leaders within the district that sets the direction for the district. And I'm on the

– right now, I’m on the Regional Management Board, which is kind of a same thing at the regional level. And that may be something that lasts for a couple of years and then it may be somebody else.

I’m engaged in some national initiatives and things. And this headquarters assignment is part of that.

So it’s very much that I want HDC to be viewed as a leader – a leading organization within the Corps, that we’re headed in the right direction, we’re supporting the broader initiatives, and that the HDC leadership is really connected and engaged.

So in terms of that being relevant, is that when the very senior folks, the (SES) levels in the Corps of Engineers thinks about HDC or they hear about them, they’re going, “You know, these guys have got their act together and it’s a good organization, their leadership’s involved and the organization is involved.” So I think that’s part of that staying relevant and vital.

And when you’re connected that way, you know what’s going on, you’re in tune with the direction of the broader organization, and so you can stay supportive and reactive.

Lisa Mighetto: What do you think are the biggest challenges that will face HDC in the next few years?

Brent Mahan: Yes, that’s kind of an easy one for me.

One challenge – and I think we’re doing a lot to address this because it’s very important to us – a key to our success is our technical knowledge. And we need to be sure that we are doing things and we have a number of initiatives and folks, I talked to you about them, that we have in place where we’re trying to help our newer staff get up to speed quickly on that technical knowledge.

And HDC University, our expertise groups, or communities of practice reflect that; our mentoring program reflects that; our career guide reflects that; and all these things that we’ve implemented in recent years.

Lisa Mighetto: The career guide . . . I don’t know if I’ve heard about that?

Brent Mahan: Oh, well, it’s really just a document that lays out for HDC staff the kinds of training that they need to get, differentiates things to think about relative to a technical career track or leadership – and/or the leadership career tracking, I guess should say. So it helps them identify how to progress within the organization.

Lisa Mighetto: Okay.

Brent Mahan: And what kinds of avenues of progression are available.

Lisa Mighetto: Okay.

Brent Mahan: We can get you a copy of it, if you wanted.

Lisa Mighetto: That would be great.

Brent Mahan: Teri has probably got a copy you can review, have you talked to Teri?

Lisa Mighetto: No.

Brent Mahan: Teri Galloway? Our admin officer?

Lisa Mighetto: No.

Brent Mahan: Okay. She’d be the right person. You only need to make a note to get you a copy of that.

Lisa Mighetto: Thank you. I can include it in your appendix then.

Brent Mahan: All right.

Lisa Mighetto: Well, I’ll see how lengthy it is, but . . .

Brent Mahan: Yes. Yes, right, you can look at it; see what you think.

Lisa Mighetto: Other interviewees did talk about HDC University and about mentoring and concern about the loss of technical expertise with an aging workforce and the fact that there are 50 percent new people . . .

Brent Mahan: Yes. The other thing that we’re doing is reorganizing again. And part of the rationale for that reorganization is that it supports the transfer and exchange of information. It’s an enabler for helping our newer staff to learn and grow – so that we

can maintain that technical proficiency.

So that is a challenge for the future that I think that we're addressing.

The other big challenge is that the way hydropower is funded in the Corps of Engineers is changing. And we have largely seen that change occur over the last seven, eight, nine, ten years within the federal Columbia River power system. We're beginning to see that change in other regions within the country.

I think we will see a continuing trend nationwide similar to what it is like in this region. That is that the funding for hydropower will come from the power-marketing agencies and the preference customers with less reliance on appropriations.

Lisa Mighetto: Which is traditionally what the Corps has relied on?

Brent Mahan: That's correct. And what that – in my mind, means is that we still are providing primary engineering services to the districts that we serve but we have more players at the table. There will be more of a direct link to the folks that are providing those investment dollars in the output.

So there's going to be more expectation of operating like a business – and less of the political aspects that congress goes through, which has, you know, some business elements to it but

there's other things that drive funding in the political arena.

I think that the expectations for providing cost-effective and timely services and for providing quality products – well, that's important now; it is just going to become increasingly important and there are more players at the table that are going to drive that.

And I think there is going to be more emphasis on performance measurement and related metrics over time. That's what we've seen with what's occurred in this region with Bonneville Power Administration.

So how I would capture that, in terms of a challenge, is that our ability to effectively and efficiently manage the work that we do is going to become increasingly important.

Improved work management is part of the reorganization that we're about ready to embark on. We're going to establish a product coordination branch staffed with the folks that manage our work.

You know this sort of parallels that change that I was talking about in the leadership arena. In the past, the folks who managed our work were generally technical engineers within HDC. And we're now recognizing that probably what's more important than having the technical background, it's making sure that we're hiring folks from within the organization or from without that have the talent and skills in managing work, regardless of the fact that its hydropower work.

Now – you need to be able to think hydropower and have the knack for hydropower and communicate with our customers on hydropower matters. But they don't necessarily have to be designers and engineers in hydropower. They need to be able to relate with those folks on their teams. But their real strength is managing work – project management.

So I think that's an area of challenge and some things that we're doing organizationally to address that challenge.

Lisa Mighetto: Is there a time frame for the reorganization?

Brent Mahan: Well, the plan is to begin a transitional phase this summer with the idea of doing the full reorganization this fall sometime.

Lisa Mighetto: Okay.

Brent Mahan: And this whole decision came out of one of our strategic initiatives, which was the effective and efficient organization. I suspect you've probably talked to some folks about it . . .

Lisa Mighetto: Yes.

Lisa Mighetto: Well, is there anything that we haven't talked about in terms of major developments and major challenges for HDC that I should be sure to include in this history?

Brent Mahan: Those are the two big ones that I think about, which are managing

our work and making sure that we're maintaining that technical proficiency and quality.

Lisa Mighetto: What do you like best about your job?

Brent Mahan: Well, I really think we have a great organization with just outstanding people. And that's what I like; I really value that.

I really feel that we've done some outstanding work in terms of improving ourselves as an organization and really looking ahead to the future and having a bright future and in doing things to position ourselves to be successful in that future. And it's really exciting to be involved in that. So, you know, I think it's really the people part.

But I also think that we're really providing an important service to the Corps and the nation because hydropower is an important element in providing power to all parts of the country where there are Corps generating plants. It provides not only power but also it provides important ancillary services that are really transmission-stabilizing services.

And generally it's an environmentally friendly way of producing energy. I mean, there are some challenges, but it's one of things that we're constantly working on. And HDC does a lot of work in improving the environmental aspects of hydropower and it's funded to be involved in this area that's important for our nation.

Lisa Mighetto: Okay. Is there anything that you'd like to add?

Brent Mahan: I think we have a proud history in terms of developing major projects in the Columbia River and Snake River systems, and that we've transitioned to a new kind of work, away from large new projects to making sure that we're modernizing the hydropower facilities that the Corps has, and that we're doing the maintenance and repair engineering to keep the equipment running and producing as much power as we can with the water that's available and, as I mentioned, addressing environmental issues in terms of improved fish passage particularly in the Northwest and dissolved oxygen issues in other parts of the country. And that we have made that transition to a new way of doing business with the focus on a larger number of smaller projects.

You know, we have a really exciting and bright future. There's a continuing need for investments in hydropower infrastructure. And we have a key role to play in terms of doing the engineering for that. And with the changing funding arrangement, it's providing really new challenges and opportunities too to be able to be more efficient at providing those services.

So there's a lot of work that needs to be done in the future, so I think we have a really bright future.

Lisa Mighetto: I've heard that lot from people that I've talked

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... a key to our success is our technical knowledge.

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to and also that sense of pride that you mentioned.

Brent Mahan: Yes.

Lisa Mighetto: About having these important projects in the Portland District – I mean from the beginning – and evolving with that.

Brent Mahan: Yes.

Lisa Mighetto: Would you say morale is high at HDC?

Brent Mahan: Yes, I think it is. I think it's gotten better. But – I think it's high now and I think it's better than when I first got here.

Lisa Mighetto: When you first got there, was there concern because of the transition you mentioned, and you mentioned the tension?

Brent Mahan: Yes. I think . . .

Lisa Mighetto: HDC was entering a new era really.

Brent Mahan: Yes, I think what we have tried to do is to create a style for our staff and our organization that's more collaborative – we want to work with the districts to help them be successful. And I think when you do that, it creates a more positive work environment. So I think that has helped, helps morale.

I think also for the new engineers that are coming onboard that we're very, very interested in creating a work environment for them – and it's not just the engineers, it's other employees as well, but we,

because we're an engineering organization – create a working environment that's exciting to be in, it's challenging, and interesting, it's positive, there's lot of responsibility, the new engineers get responsibility quickly, and I think that they like that, and it reflects the characteristics of the generation that is entering the work force.

Lisa Mighetto: Do you use that to your advantage when you're recruiting?

Brent Mahan: Oh, yes, absolutely – absolutely.

We can't often compete with the private sector in their salaries. But what we can compete on, I think, is the diversity, the level of responsibility, the kind of work that we do; it's very challenging and interesting and there's just a lot to learn and you can spend a career continuing to learn and grow.

And then, we also have a lifestyle that I think we can compete on. We really try to provide an environment where you can have a challenging and interesting career where you work hard but that you can also have a life, too, that you can have a family and outside interests and the ability to pursue both of those things which, is important to me, and I try to make it important for us as an organization to provide that environment.

Lisa Mighetto: But you worked in, did you say, the New York District and Alaska District?

Brent Mahan: Yes, New York District, Alaska District, Seattle District, the North Pacific Division Headquarters and Portland District.

Lisa Mighetto: How does Portland compare to the others or is that too general to answer? That is, does the Portland District seem distinctive?

Brent Mahan: Yes, I think it is... I don't know how you describe it.

I think Portland District has a certain level of professionalism and sophistication and a willingness to try new things, kind of be a leading district within the Corps of Engineers.

It's – we have the ability to attract, you know, probably because of the lifestyle – I think of the city and the region, it's a good place to live. We have the ability to attract high-level talents.

Lisa Mighetto: Do you use that in recruiting for HDC, that is, Portland itself?

Brent Mahan: Yes, we do. Yes.

Lisa Mighetto: That's interesting.

Brent Mahan: Well, you know, we talked about how we have all these new staff members.

But the other thing is we've set a very high bar. We put a lot of energy into our recruiting to try to get as good an applicant pool as we can. So we have a large number of very highly qualified folks. And there's been some

– we're having a pretty good luck with that now but – like when the whole Internet boom was going on, it was a very competitive environment particularly for electrical engineers. So it's difficult to do that.

So we put a lot of effort in the recruiting and then we put a lot of effort into selecting so that we really set a high bar in terms of the employees that we're bringing into the organization.

Lisa Mighetto: Yes.

Brent Mahan: We're looking for folks who have what I call "the complete package," which is they're not only good technically... if they're entry level, they're showing that they've had the right kind of course work and program and have gotten very good grades in that, but they also reflect strong interpersonal skills and ability to communicate and work with teams and that they can relate well to others because that's a very important part of that cultural change is being able to relate with the folks that we provide our engineering services for, as well as to relate to one another within HDC.

So that's something else we've been focusing on. And we've really been bringing onboard some great folks. I mean we had good people before that but it's just really fun and exciting to see the new folks that we're bringing into the organization and the vibrancy they bring.

Lisa Mighetto: I haven't talked to anybody in depth about how recruiting works.

Are you recruiting on an annual basis? I mean are you always on the lookout or if this happens once a year?

Brent Mahan: No.

Well, what we do every quarter is meet and we look ahead, we do an annual plan, where we look ahead at our positions and we look at our workload trends and our anticipated retirements, and the other kind of staff turnover we might see. And then what we're looking at in terms of workload, in terms of the kind of disciplines we think we might need, and the skills and talents.

And then we lay out a staffing plan in terms of potential recruitments based upon the environment that we see for the future and the kinds of positions we think we need.

And then at least quarterly we meet and we talk about how are we doing on that staffing plan relative to our recruiting and whether or not we need to make changes to it. And that's an ongoing cycle that we have.

So when we're recruiting new engineers, there is sort of the – spring graduation is a real important time to do it, but there's also the winter graduation. So it just kind of depends.

We also try to make decisions as to whether or not we have a journeyman level or entry level or kind of what the timing is as to whether or not we can, you know, what's the best fit and what's the

job market like and those kinds of things.

But it's really on ongoing recruiting process.

Lisa Mighetto: And who does this? Who does the staffing plan? Who does the interviews? Does it vary depending on the position?

Brent Mahan: Yes.

Lisa Mighetto: Do you recruit people personally?

Brent Mahan: Well, yes, I do with some positions. I have done some personal, just talking to folks and really I guess you'd say selling our organization, I mean trying to convey to them why I think that they might want to consider applying for a position here.

And we believe very strongly in the competitive process in terms of getting the best folks. But I'm also very interested, as I said, in getting that stronger candidate pool to choose from so I frequently talk to folks about who we are and what we do and the kind of work environment that we have here and why it's appealing and, you know, trying to attract folks.

Teri Galloway has the primary responsibility of working with the civilian personnel office for our recruiting. But Teri is very involved in job description development and classification, as well as getting information out on positions that we're recruiting for, the outreach efforts.

And we engage our branch chief in that as well - like we may take one of our branch chiefs and one of our newer engineers and they would go to a career fair at a university, for example, and talk to students.

Lisa Mighetto: Okay.

Brent Mahan: So, you know, it's pretty broad-based, the management and staff. But Teri really plays the lead role in terms of the actual recruiting and selection efforts.

And you asked about the selection panel. They vary depending on the position. But one thing we use that has worked very well for us on really every position that we hire - this can be from a secretary level to my level or just below - is we use panels that reflect diverse perspectives on the process.

Sometimes, we'll have somebody representing one of our customer districts so that we bring that perspective to the table. We're really bringing diverse views to the selection process. And it works very well because everybody brings a little bit different . . .

Lisa Mighetto: Sure.

Brent Mahan: ...perspective to it, so it serves us well.

We use panels for all positions from secretaries to managers

This approach also means that we're tying up a lot of time and energy into making those selections and that's a very important thing to do. Because

if you get it right it really, really serves the organization well. So it's an important thing to do, we think.

Lisa Mighetto: It's an investment.

Brent Mahan: That's it, you've got it exactly right, exactly the way I look at it, it's an investment, pays off, pays dividends in the future. Costs a lot right now but it's worth it.

Lisa Mighetto: Was there anything you'd like to add that we didn't cover?

Brent Mahan: I can't think of anything.

You've talked to so many about the strategic initiatives that we've done in recent years and ...

Lisa Mighetto: Yes.

Brent Mahan: . . . we talked a little bit about the future and how we're changing - no, I can't think of anything.

Lisa Mighetto: Well, I thank you very much for taking the time this morning.

Brent Mahan: Well, I'm happy to do it. I think this is a really great initiative and I appreciate the efforts that you're putting into it in terms of getting a good knowledge base in which to prepare this document.

You know, it will be interesting to see the perspective on the organization from those who were in it.

Lisa Mighetto: Well, I interviewed Bud Ossey last week and he has been involved – well, he actually worked on a survey for Bonneville Dam in 1938.

Brent Mahan: Isn't that amazing?

Lisa Mighetto: Yes, it was amazing. And his dad worked on Bonneville Dam. So his perspective goes way back.

Brent Mahan: Yes.

Lisa Mighetto: And then I've interviewed people like Mike Roll who started in 2001.

Brent Mahan: Yes.

Lisa Mighetto: So it has been really interesting.

Brent Mahan: Yes.

Lisa Mighetto: Several generations of people.

Brent Mahan: Yes, that's definitely true. And you were able to talk to Glenn and . . .

Lisa Mighetto: Yes, Robert and Glenn. You're right. See, that's the kind of thing we'll lay out in history.

Brent Mahan: Yes, right. And everything that I say about those early years, is my perspective [based] on hearsay, really.

Lisa Mighetto: Yes. But you inherited what was built then. And I think your comment was really interesting that what has happened in the way that HDC

has adapted reflects sort of a larger adaptation in the Corps.

Brent Mahan: Yes. Yes, I think that's true.

Lisa Mighetto: And that's interesting.

Brent Mahan: Yes.

Lisa Mighetto: It's connected to larger trends.

Brent Mahan: Yes.

Lisa Mighetto: And actually larger national trends.

Brent Mahan: Yes.

Lisa Mighetto: So it is very interesting.

Brent Mahan: And you expect that because the folks that are involved in the selection of this position aren't really within HDC.

So I mean 20 years ago, I wouldn't even been able to compete for this job. I mean it just wouldn't have been possible. I wouldn't have been qualified. So it is kind of a remarkable thing.

Lisa Mighetto: And that reflects how much things have changed.

Brent Mahan: Reflects how much things have changed and how it is a broader trend . . .

Lisa Mighetto: And how adaptable HDC has been to be able to survive these kinds of changes.

Brent Mahan: Yes. Well, it's important – that's a key to survivability because the world is changing pretty fast so you've got to be nimble and anticipate those changes and be addressing it. Otherwise, you become outdated.

And if you're not relevant -- I mean, we're a mandatory center of expertise and I kind of de-emphasize that because people don't really like it. We have to be viewed as adding value or we're doomed. And it's so important for us to do and behave and provide the right kind of services in the right way, or we won't be relevant.

Lisa Mighetto: So you're saying that you shouldn't expect that your customers are forced to use you?

Brent Mahan: Absolutely not. I mean that's absolutely correct.

And it's so correct that I never use, and I don't think you'll hear anybody who runs HDC now really use that – our technical definition within the Corps – the abbreviation is MCX, mandatory center of expertise; what I'll say is that we're a national center of expertise, and it might – you'll hear most people say.

Lisa Mighetto: That's an interesting distinction.

Brent Mahan: Yes. I want to emphasize that while we're not perfect, we're trying to be better and that we can add value to the district that we provide engineering services for them so that they want to use us, they

want to call us, not that they feel like they have to.

And when they have issues and want to do something other than us, you know, I try to – I mean my philosophy, working through my branch chief, is to work with them on that and say, “You know, what do you want to do?” And if they want to try alternative approach we’ll figure out to a way to make that happen.

We want to be involved and maybe involved in the review or whatever but we don’t want to say, “Listen, this is our work and we’ve got to do it.” We want to say, “You know what – how can we best work with you to achieve what you want to achieve?”

Lisa Mighetto: Does that happen very often?

Brent Mahan: From time to time.

For some particular reason, a district might want to take a particular approach and we try to accommodate that.

And sometimes it’s a matter of having some relationship issues, and they may be frustrated with us over something. So, rather than trying to draw a line in the sand, we need to work with them and to build back the relationship and to help them be successful.

Lisa Mighetto: Do you see that as taking a long view? That is, you might give up some work now but your flexibility might make some folks more inclined to use you in the future?

Brent Mahan: Well said. It is exactly what it is.

You know, you might win the battle on it but you may have lost the war in terms of the relationship that you have with them. So it’s better to put up with what we might think is really our purview for a particular job to have ultimately more work in the long run, yes.

Lisa Mighetto: And that relates to what you’re saying about becoming a service-oriented . . .

Brent Mahan: Exactly.

Lisa Mighetto: Yes, that’s interesting. Well, thank you again for your time.

Brent Mahan: Okay. Talk to you later.

Lisa Mighetto: Okay. Goodbye.

Brent Mahan: Goodbye.



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